FOCUS ON…

Parliamentary Office for Scientific and Technological Assessment (OPECST)

PLASTIC POLLUTION: A TICKING TIME BOMB?

1. PLASTICS – RECENT MATERIALS THAT HAVE BECOME UBIQUITOUS

around the man, clockwise, starting from bottom left	
C'est pratique !	They're practical!
Stable	Stable
Rigide	Rigid
Thermoplastique recyclable	Recyclable thermoplastic
Coloré	Multicoloured
Thermodurcissable non recyclable	Non-recyclable thermoplastic
Pas cher	Inexpensive
Résistant	Strong
Léger	Lightweight
Les plastiques : multiples, divers, et omnipresents !	Plastics: multiple, varied and ubiquitous!
above the ribbon, from left to right	
Pétrole & biomasse	Oil & biomass
Biodégradabilité complexe ou impossible…	Little or no biodegradability
on the ribbon, from left to right	
Plastique = polymères + plastifiants + additifs	Plastic = polymers + plasticisers + additives
Emballage	Packaging
Jetable	Disposable
below the ribbon, from left to right	
Des milliers de formulations différentes !	Thousands of different formulations!
Une production exponentielle !	Exponential production!
Usage unique	Single use

A. A WIDE RANGE OF MATERIALS WITH INTERESTING PROPERTIES

- **A variety of polymers and formulations**

Plastics are materials made of one or more polymers to which fillers (to reduce cost or improve properties), plasticisers and additives (colourings, anti-oxidants, etc.) are added. **For plastics with the same chemical characteristics, there are hundreds, if not thousands, of different formulations**.

Synthetic polymers used in the manufacture of plastics are generally divided into two categories: **thermoplastics**, which regain their malleability when heated (accounting for 80% of plastics consumed), and **thermosetting plastics**, which cannot be melted down for reuse and are therefore not recyclable.

Polymers can also be classified according to the origin of their constituent carbon atoms: hydrocarbons for **fossil polymers** (99% of plastics) and biomass for bio-sourced polymers.

Some polymers are biodegradable, which means that they are capable of being used as a carbon source by micro-organisms under specific conditions. Polymers that are both bio-sourced and biodegradable are referred to as "biopolymers".

- **Materials with multiple properties that have become ubiquitous**

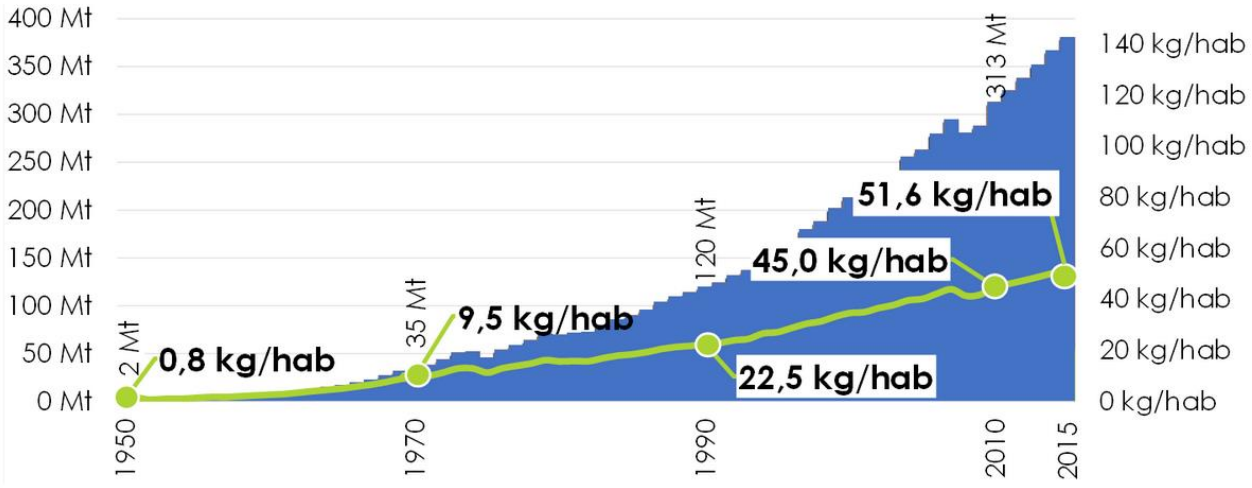
Plastics are extremely versatile materials: the variety of their shapes and colours, their flexibility or rigidity and their lightness, combined with their great strength, long life, stability and low manufacturing costs, make

them a favourite material of manufacturers. These qualities have enabled many technological innovations, and have led to plastics becoming established in all industrial sectors as an integral part of our consumption patterns.

B. EXPONENTIAL PRODUCTION UNDER THE INFLUENCE OF SINGLE-USE PLASTICS

In less than a century, plastic has become **the third-most manufactured material in the world**, after cement and steel. 359 million tonnes were produced in 2018, rising to 438 million tonnes if we include the plastics present in textiles and synthetic rubber. This production is expected to double by 2050.

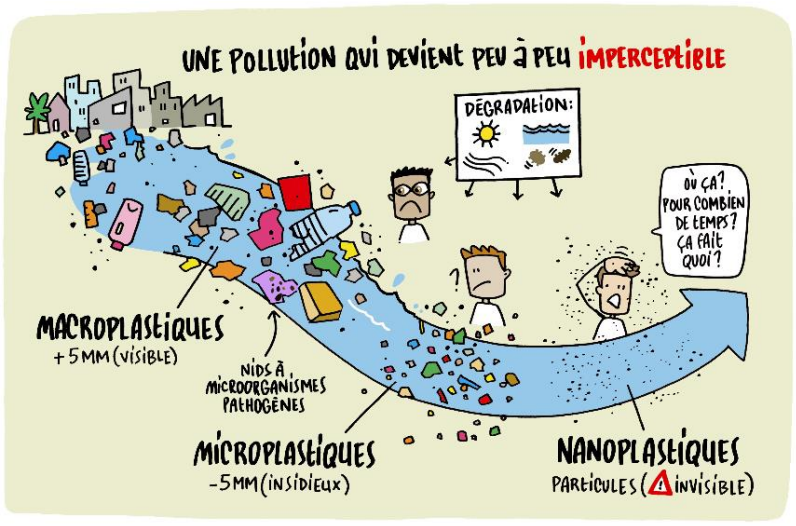
Changes in plastic production per capita between 1950 and 2015



Source: Parliamentary Office for Scientific and Technological Assessment.

Plastics were originally designed to be used as tough, long-lasting materials. Paradoxically, they are now increasingly used for single, short-term uses. **The dynamic growth of plastic production is driven by the packaging sector**, which is **the largest market for plastics** with a 36% market share worldwide (158 million tonnes produced in 2018). As a result, **81% of the plastics in circulation become waste after one year**.

2. POLLUTION IS NOT LIMITED TO MACROPLASTICS



Clockwise, from top

Pollution that gradually becomes imperceptible

Degradation

Where?
For how long?
What are its effects?

Nanoplastics
(Invisible) particles

Microplastics
-5 mm (insidious)

Breeding grounds for pathogenic microorganisms

Macroplastics
+ 5mm (visible)

A. VISIBLE POLLUTION: MACROPLASTICS

- **Pollution that is difficult to quantify but considerable**

Macroplastics are pieces of plastic larger than 5 millimetres.

An analysis of the production of plastics and what became of them between 1950 and 20151 revealed the following findings:

- since then, **the cumulative production of polymers, synthetic fibres and additives has reached 8.3 billion tonnes**;

- 2.5 billion tonnes of plastics (30% of the total) were still in use in 2015;

- **5.8 billion tonnes became waste** (70% of production).

79% (or 4.6 billion tonnes) of this waste was landfilled or disposed of directly into the environment, 12% was incinerated and 9% was recycled.

One study2 found that 72% of plastic packaging is not collected efficiently worldwide and ends up in the environment (114 million tonnes in 2018).

- **Pollution that affects all countries**

Developing countries are particularly affected. The amount of waste per capita is lower than in developed countries, but the share of poorly managed waste is considerable. **Five countries**[3] **–** China, Indonesia, Thailand, the Philippines and Vietnam **– are responsible for more than half of all the plastic waste** that ends up in the seas and oceans. This situation is expected to deteriorate further, with the World Bank predicting that waste volumes in the South East Asia/Pacific region could double by 2050.

Developed countries are also concerned: despite more efficient collection systems, there is still room for improvement in the "ultimate" management of waste at the end of its life. In 2018, 29 million tonnes of plastic waste were collected in the EU, **24.9% of which was landfilled**. **The landfilling rate rises to 50% in ten countries.** In France, where 900,000 tonnes of plastic waste are landfilled each year, the landfilling rate is 32.5%. **The situation in the United States is no better**. Only 9.1% of the 34.5 million tonnes of plastics collected in household waste in 2015 was recycled, and **75.4% (31.4 million tonnes) was landfilled**.

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[1] Geyer, R., Jambeck, J. & Law, K. L. (2017). Production, use, and fate of all plastics ever made. Science Advances, 3(7).
[2] Ellen Mac Arthur Foundation: the new plastics economy, rethinking the future of plastics, 2016.
[3] Ocean conservancy : endiguer la marée : stratégies terrestres pour un océan sans plastiques (Ocean conservancy: stemming the tide: land-based strategies for a plastic-free ocean).

Plastic pollution related to litter and illegal dumping is difficult to quantify but also needs to be considered.

Finally, exports of waste from developed countries to countries without efficient processing facilities are a significant source of imported plastic pollution. Before China banned these imports, 12% of its total plastic waste was imported from the rest of the world.

B. INSIDIOUS POLLUTION: MICROPLASTICS

Degradation of plastics

When abandoned in the environment, plastics degrade according to kinetic processes that depend on abiotic factors (ultra-violet rays, oxygen, water) and biotic factors (micro-organisms). The degradation of plastics leads to their fragmentation into small particles, which are called microplastics when they are smaller than 5 mm. Nanoplastics (between 1 nm and 1 µm in size) are also released as plastics age through the abrasion of their surfaces, which are altered over its first few micrometres, particularly through oxidation. Plastic pollution has gone from being visible to being invisible.

Microplastics come in different forms (fibres, films, granules, fragments, foams, microbeads, etc.). **There are two categories of microplastics**:

-**primary microplastics**, which are intentionally manufactured by industry for different purposes (e.g. exfoliation particles in cosmetic products). Most of these microplastics are released into the environment during the use of the products containing them.

Industrial plastic pellets[1] **are also primary microplastics**. The European Chemicals Agency estimates their annual losses at 41,000 tonnes across Europe, or 0.6% of production.

-**secondary microplastics**, which originate from the fragmentation of macroplastic waste under the effect of various environmental factors. They can also be generated by the wear and tear of plastic objects during their manufacture, use or maintenance (tyre wear, release of fibres during the washing of synthetic clothes, abrasion of synthetic grass, urban dust particles, etc.).

Pollution by secondary microplastics: the examples of tyres and synthetic textiles

- Tyres are slowly worn down with every mile they travel. A used tyre weighs two kilos less than a new one. **Tyre wear is estimated to be responsible for releasing 5.86 million tonnes of particulate matter worldwide each year**.

- In 2016, 62.1 million tonnes of synthetic fibres were produced (54 million tonnes of which were polyester), accounting for almost two thirds of the textile fibre market. Washing clothes releases fibres (the number of fibres released decreases with repeated washing cycles). The intensity of the shedding of textile fibres depends on the method used to cut them. The mechanical finishing process applied to textiles also plays a fundamental role. For example, washing a 400-gram fleece fabric releases 14 million fibres – ten times more than for other textiles.

At the European level, it is estimated that between 18,000 and 46,000 tonnes of textile fibres are released into the environment each year.

Pollution by microplastics is difficult to quantify, but secondary microplastics are thought to predominate. The still very patchy knowledge of plastic degradation phenomena explains the absence of figures validated by scientific studies.

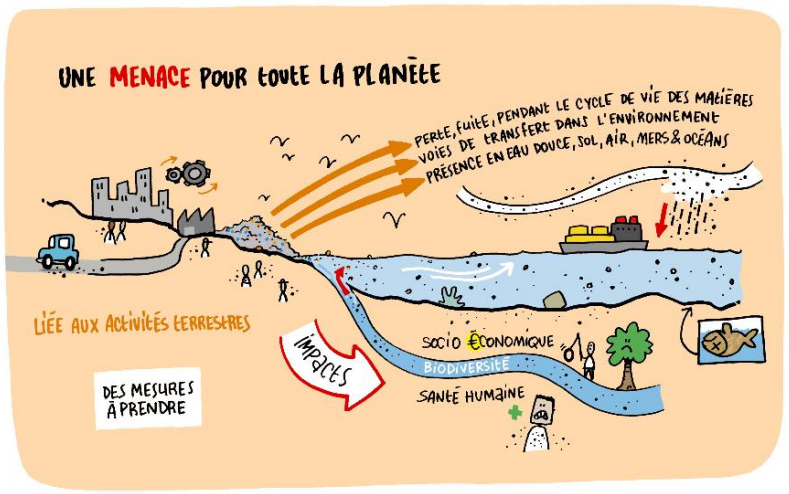
C. AN INVISIBLE AND POORLY UNDERSTOOD FORM OF POLLUTION: NANOPLASTICS

Research on nanoplastics is recent and remains incomplete. However, if the hypothesis of macro-waste fragmentation into nanoplastics were to be proven, it would cause particular concern for two reasons. On the one hand, the quantity of nanoplastics in the environment could be considerable, and far greater than

[1] Polymer pellets, raw materials for the manufacture of resins.

that of macro- and microplastics. On the other hand, by analogy with the known translocation properties of other nanoparticles, nanoplastics are likely to penetrate all organs by crossing the intestinal barrier when ingested or the pulmonary barrier when inhaled.

3. DIFFUSE POLLUTION THAT MAY POSE A THREAT TO ECOSYSTEMS AND HUMAN HEALTH



Clockwise, from top

A THREAT to the entire planet

Loss, leakage during the life cycle of materials
Environmental transfer pathways
Presence in freshwater, soils, air, seas & oceans

Socioeconomic
Biodiversity
Human health

Impacts

Measures to be taken

Linked to terrestrial activities

A. POLLUTION ORIGINATING ON LAND AND AT SEA

Although images of plastic pollution are often associated with the sea, human activities on land are mostly responsible.

Maritime activities contribute to this phenomenon primarily through four sectors: fishing and aquaculture activities (**640,000 tonnes of fishing nets are reportedly abandoned in the oceans each year worldwide**); maritime transport (through the loss of containers and the dumping of plastic waste at sea); recreational boating activities; mining and oil exploration and exploitation.

Overall, according to known observations, 80% of plastic pollution in the seas and oceans is linked to human activities on land, while marine activities contribute 20%. However, this proportion is not based on any scientific study.

B. POINT SOURCES OF POLLUTION SCATTERED AROUND THE WORLD

Plastic pollution is a dynamic process that can be roughly divided into three stages:

● The first stage is **the loss or release of plastics into the environment**. This occurs throughout the life cycle of these materials.

● The second stage is **the dispersion of plastics present in the environment**. This dispersion occurs as a result of:

- **wastewater or rainwater networks**: textile fibres, microplastics from cosmetics and detergents, and certain macroplastics such as sanitary textiles, are transported by wastewater networks. Plastic waste discarded on the public highway, and microplastics from the abrasion of tyres, brakes and road surfaces, also reach the stormwater networks;

- **air and wind**: this transfer pathway includes textile fibres released by friction, as well as urban dust and tyre particles. This transfer pathway concerns both macro and micro waste;

- **atmospheric deposition (especially from rain and snow)**: once set in motion in the atmosphere by the wind, plastic particles may be redeposited on the ground by rain or snow;

- **rivers**: several studies have highlighted the role of rivers in transporting plastics to the oceans. Globally, rivers are estimated to discharge between 6,000 and 7,000 tonnes of microplastics per year into the oceans,

with these volumes being distributed evenly between them. Contrary to popular belief, the fragmentation process does not begin when plastics arrive in the oceans. This process is thought to be ongoing in rivers, which transport most plastics in the form of microplastics.

- **marine currents**. The link between the accumulation of waste at sea and the convergence zones of ocean currents (gyres) was established by the oceanographer Charles J. Moore in 1997. Five accumulation areas have been observed in the North Pacific, South Pacific, North Atlantic, South Atlantic and Indian Ocean. These vast swirling movements are accompanied by a slow convergent flow at the surface which concentrates the floating particles. When the accumulation of plastics in the North Pacific Gyre was first discovered, some observers dubbed it the "seventh continent" (due to its size and the sheer amount of waste present). In reality, it is more like a "soup" of plastics invisible to the naked eye (the concentrations of plastics vary from 678 particles per m² for those between 0.5 and 5 mm to 3.5 per km² for waste larger than 50 cm). Furthermore, the amount of waste accumulated in the gyres is estimated at 215,000 tonnes, while 10 to 20 million tonnes are discharged into the oceans each year. Many researchers are seeking an explanation to what they call "the mystery of the missing plastic".

● The third stage is the arrival and accumulation of plastic waste in one of the four compartments: fresh water, soil, air, and the seas/oceans. This "arrival" is not always final, and plastics may be set in motion again and move from one compartment to another.

Knowledge about the fate of plastic pollution is still very patchy. For a long time, research focused exclusively on the oceans before being extended to fresh water. The scientific community has very recently taken up the issue of plastic pollution in the soils and air, but these fields of research still need to be explored in greater detail.

C. POLLUTION WITH MULTIPLE CONSEQUENCES FOR THE ECONOMY, BIODIVERSITY AND HUMAN HEALTH

- **A certain socio-economic impact that is hard to quantify**

It is very hard to assess the economic impact of plastic pollution. The United Nations Environment Programme estimates the annual damage to marine environments worldwide at $8 billion. The most seriously affected sectors are fishing, tourism and maritime transport.

- **An impact on biodiversity that is not limited to images of strangulation or plastic ingestions**

Images of dead marine organisms that have either been entangled by plastics or poisoned after ingesting them are highly publicised. In fact, it is estimated that **1.4 million birds and 14,000 mammals die each year after ingesting macroplastics**.

However, even more attention should be paid to the chemical risks related to plastic pollution.

Plastic waste materials can be a source of contaminants (endocrine disruptors and persistent organic pollutants) due to the chemicals they contain (especially the plasticisers and additives), which may be released during the time spent in contact with the environment, or within organisms.

Variable toxicological effects (on physiology, metabolism, behaviour and reproduction) are observed in the laboratory on different living organisms such as corals, oysters and certain types of fish. These studies do not enable any definite conclusions to be made about the nature of the impacts of plastics in the natural environment, where exposure (at a chronic level) differs substantially from that simulated in the laboratory (which is more akin to acute exposure).

Plastic waste can also be a vector of contaminants, including persistent organic pollutants, and is therefore likely to have an amplifying effect on the chemical pollution already present in the environment.

Finally, plastic waste can serve as a physical conveyor of invasive or pathogenic species. Recent research by IFREMER, as yet unpublished, shows that species such as toxic dinoflagellates and other oyster pathogens attach themselves to plastics, which carry and disperse them throughout the marine environment.

Given the current state of knowledge, it can be said that plastic pollution poses a risk to biodiversity. However, it remains difficult to quantify the risks to human health.

Given the projected growth in plastic production over the coming decades, the ample evidence of the dangers of uncontrolled pollution by microplastics and their persistence in the environment, it is urgent to apply the precautionary principle and take appropriate steps now to combat the release of plastics into the environment.

4. A REAL BUT STILL INSUFFICIENT AWARENESS OF THE EXTENT OF THIS POLLUTION AND ITS CONSEQUENCES

Dawning of a real but insufficient awareness

International conventions	Improvements with awareness of pollution
Recycling strategy	Limited by economics, technology and regulatory aspects
Engagement of associations	Whistleblowing and advocacy
Studies & Research	In progress or recent
Involvement of companies	Greenwashing

A. A GROWING GENERAL AWARENESS

International law has taken up this issue by adopting several conventions to ban the dumping of plastics in the sea (London Convention, Marpol Convention), to ensure the progressive elimination of persistent organic pollutants (Stockholm Convention), and to strengthen controls on exports of contaminated or mixed plastics (Basel Convention).

To address the dilemma concerning a material that has become indispensable to many sectors of the economy but with deleterious environmental impacts, **the European Union implemented a Circular Economy Action Plan in 2015 and a Plastics Strategy in 2018**. These European texts encourage reuse, recycling, repair, and the promotion of more sustainable and non-toxic materials with a view to reducing the amounts of waste generated.

The Directive of 5 June 2019 on the reduction of the environmental impact of certain plastic products has stepped up the momentum by targeting single-use plastics. From 3 July 2021, cotton buds, cutlery, plates, straws, drink stirrers, balloon sticks, food and drink containers made of expanded polystyrene will be banned from the market.

Over the past ten years, **France has also adopted a series of legislative measures**[1] **to promote the recovery of plastic waste**, reduce the use of single-use plastics and intentionally added microplastics, increase manufacturers' responsibility, better inform consumers, and promote reuse.

Local and regional authorities are also strongly involved in waste prevention and the development of the circular economy.

1 Law of 17 August 2015 on the Energy Transition for Green Growth,
Law of 8 August 2016 for the Restoration of Biodiversity, Nature and Landscapes,
Law of 30 October 2018 for the Balance of Trade Relations Between the Agricultural and Food Sector and Healthy and Sustainable Food,
Law of 10 February 2020 on the Fight Against Waste and on the Circular Economy.

Civil society also plays an active role, particularly through environmental associations, and makes an essential contribution by sounding the alarm about the environmental and human health risks posed by the unbridled consumption of plastics.

Under increasing pressure from both public authorities and public opinion, **a growing number of companies are making commitments to reducing plastic pollution** by setting targets for the recyclability, reusability or compostability of their packaging. However, this commitment varies according to their size and their sectors of activity.

Finally, **the French and international scientific community has embraced the issue of plastic pollution**. The number of research projects has been growing rapidly over the last ten years, and in addition to studying the phenomena linked to plastic pollution, this research also covers its consequences and the search for solutions.

B. MEASURES OF QUESTIONABLE EFFECTIVENESS

- **A long-standing policy focused on improving recycling**

In the context of the circular economy, recycling enables waste to be recovered and re-injected into the original production processes. Plastic recycling rates are particularly poor: in France, they stood at 24.2% for all plastic waste in 2018 and 29% for plastic packaging alone in 2019. Substantial losses are observed between the volumes of waste produced and collected on the one hand, and the quantities collected and recycled on the other. A series of measures have therefore been adopted, in the framework of several laws, with a view to improving collection rates, ensuring the greater recyclability of plastics, and developing outlets for the use of recycled plastics. **The aim is to "massify" recycling and make it more efficient**.

However, there are several limitations to plastic recycling.

- an **economic limitation** associated with the lack of profitability due to the collapse of virgin resin prices following the decline in oil prices;

- **numerous technical limitations**: due to the degradation of polymers during the mechanical recycling process, the process is not infinite. In addition, the characteristics of many plastics (thermosetting and multilayer plastics, composites) currently prevent them from being recycled;

- **regulatory limitations**, which prevent the recycling of plastic products that were sometimes first marketed decades ago and manufactured using substances that are now banned (notion of legacy substances).

- **Insufficiently ambitious reduction policies**

The policy of reducing certain uses of plastics began in 2016 with the ban on carrier bags. It has been stepped up considerably since 2020 and should lead to a significant reduction in the amount of single-use packaging by 2025.

Bans on single-use plastics adopted in the Law on the Fight Against Waste and on the Circular Economy

By 1st January 2021: ban on the free distribution of plastic bottles containing drinks in establishments open to the public and business premises; ban on contractual clauses requiring the supply or use of single-use plastic bottles at festive, cultural or sporting events.

By 1st January 2022: ban on the plastic packaging of unprocessed fresh fruit and vegetables displayed in retail outlets; ban on the marketing of non-biodegradable plastic tea and herbal tea bags; ban on plastic labels on fruit and vegetables; ban on the mailing of press publications in plastic packaging; ban on the free provision of plastic toys as part of children's menus.

By 1st January 2025: ban on the use of plastic cooking, heating and serving containers in school and university catering departments, childcare facilities for children under the age of six, and on paediatric, obstetric and maternity wards.

Finally, Article 7 sets the target of ending the marketing of single-use plastic packaging altogether by 2040.

However, these measures are too recent (most of them have not yet entered into force) to have had any effect or to enable their effectiveness to be monitored.

Furthermore, these bans lead to replacements with other materials which may be counterproductive and even dangerous to the environment and human health, one example being tableware made from bio-based plastics or bamboo, developed by manufacturers in response to the ban on single-use plastic cutlery, plates and cups.

As far as the reuse of packaging is concerned, a profusion of initiatives is observed at the local level, but there is still no national framework to impose standards, accelerate the development of infrastructures (bottle- and container-washing plants) and set a trajectory with quantified objectives for private operators.

Finally, there is currently no specific strategy targeting the reduction of chemical pollution by microplastics.

5. RECOMMENDATIONS

1. Raise awareness; educating and involving citizens

Raising awareness, educating and involving citizens

- Include at least one fun and informative plastic waste-collection operation (beaches, roadsides, riverbanks) in the school curriculum in order to raise awareness;
- Include a module on plastics and the pollution they can cause in all higher education courses;
- Introduce a compulsory requirement to post a notice in shops to inform consumers of their right to leave packaging at the checkout;
- Increase the number of "Here begins the sea" nudge signs around public stormwater drains;
- Introduce the compulsory labelling of all plastic fibre-based textiles with the statement: "releases microfibres into the environment";
- Increase citizens' involvement in defining policies to combat plastic pollution;
- Inform consumers about the risks associated with the misuse of plastic containers (risks of migration of endocrine disruptors when using a plastic food containers for uses other than the purpose for which they were originally intended when sold);
- Promote the use of cloth masks by citizens.

2. Reduce plastic production

Reducing plastic production

From left to right:

Listing plastics to be reduced

Encouraging
Compelling
Banning

Drinking water in public places

And helping me to improve my consumption

- Define a prioritised list of plastics to be reduced by considering their quality, avoidability, life span; risk of release into the environment; substitutability;

- Accelerate the ban on intentionally added microplastics by recognising them as persistent organic pollutants;
- Apply leverage through public procurement to accelerate the reduction of plastic consumption;
- Develop and extend access to drinking water in public spaces in order to reduce the use of single-use plastic bottles;
- Speed up the reduction of plastic packaging consumption by businesses;
- Help companies that may be directly impacted by plastics bans to move into other lines of business;
- Impose the use of bio-based and compostable plastics in the agricultural film sector;
- Prohibit the use of expanded polystyrene as a packaging material, including for packaging fresh produce (fish) and fragile objects.

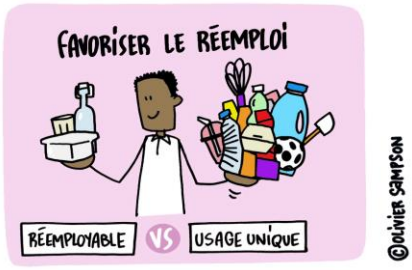
3. Prevent the release of plastics into the environment

Preventing releases of plastics into the environment

Pellets Microbeads

- Tighten the regulations to prevent the release of industrial pellets;
- Impose the geolocation of industrial fishing gear and all containers carrying pellets or plastics;
- Encourage the use of fishing and shellfish-farming equipment made of single-substance, biodegradable materials;
- Tighten the regulations on tyre certification by extending it to include tread abrasion;
- Develop a standardised test procedure to measure the dispersion of synthetic turf particles and make their marketing dependent upon compliance with a maximum dispersion threshold;
- Ban balloon releases;
- Draw up an inventory of existing and former landfills and unauthorised landfill sites; develop a plan for their progressive elimination;
- Prohibit the use of substances used as additives or fillers in the formulation of any plastic if they have been classified under REACH as toxic, very persistent and bioaccumulative.

4. Promote reuse

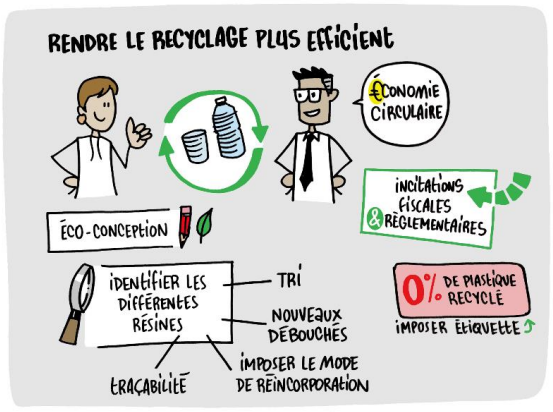


Promoting reuse

Reusable vs single use

- Subsidise reuse on a massive scale;
- Facilitate the return of the deposit on glass bottles for beverages, especially for local beverage production), including by accelerating the development of infrastructure (glassworks, washing industry, etc.);
- Draw up a national roadmap for food containers made of materials other than plastic;
- Increase – beyond the current 2% – the share of contributions collected by environmental protection organisations dedicated developing reuse.

5. Make recycling more efficient



Making recycling more efficient

Clockwise, from top right :

Circular economy

Tax & regulatory incentives

0% recycled plastic
Require labelling

Identify different resins
-sorting
-new outlets
-impose reincorporation methods
-traceability

Eco-design

- Document waste flows per resin with a view to creating specific recycling processes where justified by the quantities involved;
- Immediately prohibit the landfilling of plastics for which an operational recycling scheme currently exists;
- Impose reincorporation rates per resin and per product;
- Establish tax and regulatory incentives to encourage the incorporation of recycled plastics;
- Impose a transparency requirement for the additives used in order to guarantee their traceability for end-of-life management (sorting, recycling and reincorporation);
- Ensure the traceability of the incorporation of recycled raw materials in order to prevent fraud;
- Make the marketing of any new plastic packaging dependent upon its compliance with environmental criteria (recyclable, compostable or reusable);
- Impose the labelling of the percentage of recycled plastics incorporated into the final product, even if it contains none whatsoever ("0% recycled plastic");
- Generalise the eco-design of all plastic objects, notably by associating them with a technical and economic analysis of recycling in order to calculate the cost;
- Enforce international regulations on plastic waste exports to third countries by increasing their monitoring and traceability.

6. Support knowledge acquisition and research

Supporting knowledge acquisition and research

Clockwise, from top center:

Solutions

Human & social sciences

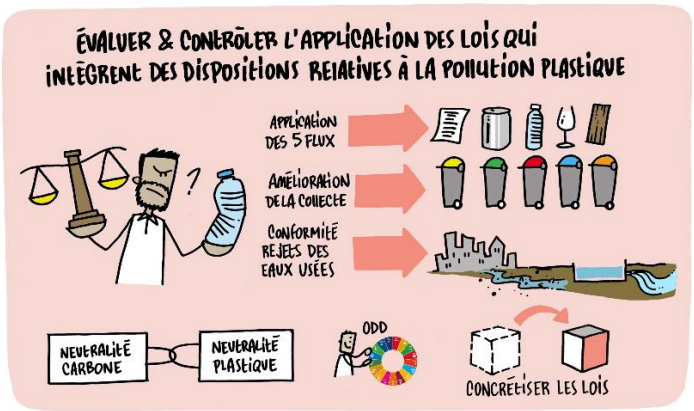
Dissemination in the environment & food chain

Microplastics
Nanoplastics

Toxic impact

- Continue research into sources of plastic pollution and their environmental transfer mechanisms, with a particular focus on soils and the atmosphere; develop a better understanding of the fate of plastics by studying their ageing under standardised natural conditions, with particular emphasis on microplastics and nanoplastics; map the distribution of pollution on a global scale;
- Harmonise the definitions of microplastics and nanoplastics; standardise the protocols for collecting and measuring data on plastic pollution;
- Gain a better understanding of the toxic impacts of microplastics, and develop new risk assessment methods integrating the combined effects with other pollutants;
- Step up research on the transfer of microplastics and nanoplastics in the food chain;
- Strengthen the role of cooperative science by funding calls for projects involving research organisations and associations;
- Support research in the human and social sciences in order to obtain quantitative and qualitative data on consumption and production practices, the perception of risk, mechanisms that promote the acceptance of change, the development and evolution of social norms, etc.
- Encourage environmentally oriented corporate sponsorship in order to facilitate an increase in resources for research and associations.

7. Assess and monitor the implementation of laws that incorporate provisions on plastic pollution, and ensure that the laws adopted do not contradict the objective of combating plastic pollution



Assessing & monitoring the application of laws incorporating provisions on plastic pollution

Application of the 5 flows

Improvement of collection

Compliance of wastewater discharges

Carbon neutrality – Plastic neutrality

Passing of concrete laws

8. Promote new actions at the European and international levels

Promoting new actions at European & international levels
A global treaty!
Change in the Water Framework Directive
Scientific platform on plastic pollution
European regulation on endocrine disruptors

- Set up a European or global scientific platform on plastic pollution, similar to the IPCC, in order to provide shared access to standardised data;
- Promote a global treaty that aims to reduce plastic pollution;
- Develop the Water Framework Directive in order to take account of the problems associated with plastics, and require Member States to adopt measures to tackle plastic waste in surface waters, as promoted by the Marine Strategy Framework Directive;
- Tighten the European regulations in order to provide a more effective response to endocrine disruptors.

Cédric Villani

Chairman,
MP for Essonne
Non-enrolled

Gérard Longuet

First Vice-Chairman
Senator for Meuse
Les Républicains

Philippe Bolo

Rapporteur
MP for Maine-et-Loire
Mouvement Démocrate (MoDem)
and related Democrats

Angèle Préville

Rapporteur
Senator for Lot
Socialiste, Écologiste
et Républicain

Parliamentary Office for Scientific and Technological Assessment

http://www.senat.fr/opecst/index.html

http://www2.assemblee-nationale.fr/15/les-delegations-comite-et-office-parlementaire/office-parlementaire-d-evaluation-des-choix-scientifiques-et-technologiques