07 June 2021

Study on the development of shared knowledge on littering

Summary of the study

Donnons ensemble une nouvelle vie à nos produits.

Contents

2. Summary

Litter corresponds to so-called *abandoned* waste which, for various reasons, has not been able to enter the waste management circuit. It is small and should not be confused with concentrated waste, which relates to illegal dumping sites. It is easily scattered and can therefore be found in a variety of environments, from dense urban areas to the most isolated natural environments. The different types of waste and environments concerned, as well as the stakeholders affected by this phenomenon, call for a differentiated management approach based on three themes: (i) characterisation protocols, (ii) prevention initiatives and (iii) corrective actions.

Citeo is the company in charge of the "packaging" and "paper" extended producer responsibility (EPR) channels. Aware of the extent and importance of the littering problem, Citeo has been involved for several years to help curb the problem thanks to prevention initiatives. In the context of recent legislative (*loi AGEC*: French act of law on the fight against waste and for a circular economy [1]) and regulatory changes, Citeo wishes to specify its contribution in anticipation of the EPR's extension, which implies new tasks from approved companies. Indeed, starting in 2021, the latter will have to bear the costs of cleaning up litter in the DROM COM (French overseas territories), and starting in 2023 for mainland France, which are currently borne by the local authorities in charge of sanitation and public entities. Citeo, on the one hand, wishes to deepen its knowledge about littering in order to strengthen existing initiatives, in conjunction with EPR stakeholders and those involved in this issue, and on the other hand, to define an operational and sustainable strategy, established in collaboration with the various stakeholders (municipalities, public inter-municipal cooperation - EPCI, associations, public or private entities, etc.) on the basis of this collective expertise.

In this context, the consultation process sought to establish an overview of the situation about littering by involving all willing stakeholders. While a bibliographic review made it possible to identify innovative and effective methods for each of the above-mentioned themes, it was important to involve the various stakeholders through:

- A broad survey consisting of questionnaires addressed to four different categories of stakeholders (municipalities, public establishments of inter-municipal cooperation (EPCI), associations and supra-local entities) and interviews targeting various expert profiles.
- Preliminary workshops with the members of a steering committee composed of public entities, representatives of local authorities and associations with expertise on the subject.
- Debate sessions taking into account each theme according to two different routes in order to achieve a multi-stakeholder assessment (1 session per theme for the institutional route and 2 sessions per theme for the operational route). These sessions brought together institutional stakeholders, local authorities, supra-local stakeholders, researchers, as well as associations active regarding the subject.

This summary synthesises the main results of the exchanges. It is supported by three annexed documents to be consulted for more details (the assessment, the results of the online survey and the summary regarding debate sessions).

[1] *Act of law on the fight against waste and for a circular economy: https: //www.ecologie.gouv.fr/loi-anti-gaspillage-economie-circulaire-1*

3. Background and objectives

1. Background on the issue

The context of waste management is very particular **as it involves the challenge of dealing with a stream that should not exist**. Indeed, litter is waste that, by definition, escapes the conventional waste management circuit and for this reason, does not benefit from many of the existing systems. The causes of their occurrence are diverse[2]. Therefore, it is important to look at all the causes, beyond the overly simplistic approach of incivility.

Litter is a frequently used term, though it is not legally defined. Thus, in the context of a study published in 2019 by ADEME (Agency for ecological transition) to characterise the problem of litter, a definition was suggested. The ADEME (Agency for ecological transition) identifies three categories of litter, namely:

- **Waste repository outside of the disposal regulations**, which correspond to waste that is most often found near voluntary disposal points or disposal points;
- **Concentrated** waste ranging from the smallest to the largest, such as piles of bulky waste or construction waste, for example;
- **Scattered** waste such as cigarette butts, packaging, paper, plastic bags, etc., which are very diverse in nature, but smaller by definition (e.g. Figure 1).

It should be noted that litter can be caused by dumping outside of the disposal regulations or by concentrated dumping, which is a source of littering in the environment.

The present consultation focuses on litter, a more detailed definition of which is suggested below (e.g. § 5).

Figure 1. *Illustrations of litter (ECOGEOS image library).*

[2] *In the order of the production chain (non-exhaustive list): overproduction of single-use products, lack of eco-design (especially in a Design against littering logic), lack of efficient disposal systems or services, problems related to the billing of the waste management service, incivilities, lack of knowledge about the impact of litter on the environment, lack of awareness, lack of sanctions, etc.*

For a long time, the problem has been addressed by focusing on curative aspects to limit the visibility of this so-called "orphan" waste. While the approach is important, it does not fully address the multiple challenges that have been identified **(e.g., 8**):

- **Scattered and/or incomplete stakeholders and expertise**: many stakeholders work more or less directly on the litter issue. However, their actions differ in terms of geographical scale (local or national) and do not approach the topic from the same angle (environment, cleanliness, etc.), nor with the same depth. Also, the lack of centralisation of data and acquired knowledge by these stakeholders makes it difficult to set up coordinated action.
- **Citizen expectations are increasing**: litter seems to be increasing. This is another issue that is receiving a lot of media attention, particularly the macro-waste[3] impact (including plastic[4]) on biodiversity and, more specifically, on marine environments. This media coverage has raised awareness of environmental issues, which has led to increased expectations from citizens for upstream solutions (on the production stages by marketers but also regarding the commitments of public authorities and communities to remedy the situation).

- **Reinforcement of the regulatory framework**: the scope of the Extended Producer Responsibility (EPR) extension was set out in the *loi AGEC* (French act of law on the fight against waste and for a circular economy), which specifies that "the financial contributions paid by the producer to the eco-organisation cover the costs of prevention, collection, transport and processing of waste**,** including the costs of litter collection and processing which have been deposited or managed contrary to the requirements" set out by the law. It is expected to be implemented throughout France by 2023 (by 2021 in the DROM-COM: French overseas territories).

2. Objectives for Citeo

Citeo is a mission-led business company (*entreprise à mission),* created by mass market and distribution companies, to reduce the environmental footprint of their packaging and papers, by proposing some solutions to reduce, reuse, sort and recycle them. Citeo is a company approved for the period 2017-2022 by the Ministère de la Transition Écologique (Ministry of Ecological Transition), within the EPR framework, for the management of household packaging waste and graphic paper waste.

Today, on the subject of the fight against littering, of which packaging and paper can be a part of, Citeo is already present on the main action levers: citizenry education; awareness campaigns; support for local authorities and natural areas, particularly through programmes designed in partnership with the association *"Progrès et environnement" (Gestes Propres)*, such as the *Gardez Triez* programme; support for the implementation of sorting at events and in establishments through the *Quitri* platform).

[3] Macro-waste refers to waste larger than 5mm. Micro-waste is usually less than 5mm in size.
[4] Pew Charitable Trusts and SYSTEMIQ. 2020. « Breaking the Plastic Wave: Top Findings for Preventing Plastic Pollution - A Comprehensive Assessment of Pathways Towards Stopping Ocean Plastic Pollution », https://pew.org/2WmV10d.

In the future, as part of the implementation of the European directive on reducing the incidence of certain plastics on the environment (SUP directive[5]) and the loi AGEC (French act of law on the fight against waste and for a circular economy), the extended producer responsibility (EPR) for packaging, entrusted to Citeo, will be extended to also take into account the costs of cleaning up and processing certain types of litter packaging. Citeo will seek to exercise its clients' responsibility by implementing only those preventives and/or curative solutions that have been shown to be effective.

Citeo's new responsibilities in this area will necessarily involve developing and/or supporting actions to :

- **To gain knowledge on the topic;**
- **To provide the best possible support to its clients** to ensure that they comply with their regulatory obligations;
- **Encourage industrials to work on the eco-design aspect** so as to produce more respectful packaging and limit the scattering risks;
- **Work with the territories** to set up socio-technical collection (out-of-home) and awareness-raising systems, adapted to the realities on the ground;
- **Work with the many stakeholders who** have already been involved in the fight against littering for varying lengths of time.

To better anticipate the actions it will have to take on the fight against littering, Citeo has made a more direct commitment back in 2019, in particular through meetings with various stakeholders who are experts and/or invested in the subject of fighting against litter. Having noted the data scattering and the lack of cross-sectoral exchanges, Citeo took the initiative in 2020 of launching a 360° consultation, making it possible, through cross-sectoral exchanges between the relevant stakeholders, to establish a shared assessment on several aspects and from several sources of information (e.g. § 4).

3. The objectives of this consultation

The objective of this consultation was therefore to **carry out an assessment to identify effective initiatives to prevent, characterise and manage littering**.

The aim of this assessment, which was carried out by means of bibliographical research, online surveys, working groups and individual interviews, was to establish how and under what conditions the solutions implemented by the various relevant stakeholders are effective. Finally, the aim was to lay the foundation for a collective reflection on the littering problem, with the aim of advancing its resolution.

[5] *This is the Single-Use Plastics Directive: https: //eur-lex.europa.eu/eli/dir/2019/904/oj*

4. Consultation methodology

In order to meet the objective of **producing a shared knowledge assessment regarding the littering problem**, several steps were taken:

- An **assessment report** has been written based on research carried out on each of the topics related to the issue.
- **Exchange and debate sessions** were held on the three themes under study and benefited from the contributions of the steering committee (COPIL).
- **Stakeholder solicitation** targeting, on one hand, experts with different profiles who were interviewed and, on the other hand, all stakeholders who wished to respond to an online survey aimed at four distinct types of stakeholders: municipalities, public establishments of inter-municipal cooperation, associations and all other entities involved in the issue in some way.

Beyond the targeted scales, the plurality of the participants' profiles also ensures that all environments, from the most natural to the most urban, have been addressed.

The detailed methodology for each stage is described in Annex 1 of this synthesis.

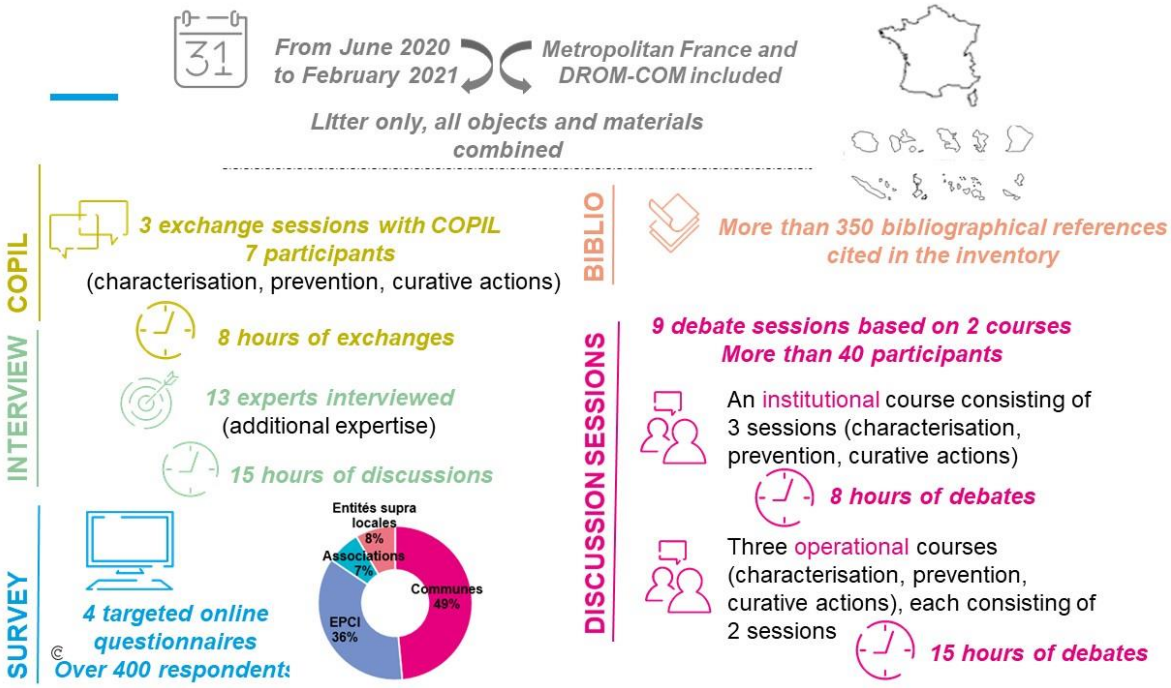

Figure 2. *Review of the main stages of the consultation.*

4. Context of the consultation

This synthesis is also supported by a consultation report and two related deliverables annexes published at the same time: the initiatives assessment and the results of the online survey.

5. Suggested definition for litter

Litter is small waste that is likely to fly away or be easily scattered. However, any concentrated dumping site can also generate litter as waste, especially scattered waste that can fly away.

Several criteria for defining litter emerged during the various discussions, according to the:

- **Environmental impact on the area**: some of the experts interviewed distinguish between littering in rural and urban areas. According to one of the experts interviewed, only waste in rural areas should be considered as litter. The vast majority of urban litter is collected by urban cleaning teams, so most of it is not harmful to the environment. Waste management could then be considered as a collection route for litter, similar to conventional collection for household and other similar waste.
- **Concentration level**: most experts interviewed defined litter by its low concentration level.
- **Waste size**: litter is defined as easily scattered, and therefore relatively small in size (but falling under the definition of macro-waste[6]).

In the course of this consultation, several categories of litter were identified:

- Those present in a structural way.
- Those present on an ad hoc or seasonal basis (following a sporting event or a distinct meteorological phenomenon, etc.).
- Those resulting from accidental pollution (i.e. generated during a natural disaster, and which may have an international dimension).

[6] *Waste larger than 5 mm (Cedre, 2018).*

6. Mapping of relevant stakeholders

1. Stakeholders typology according to their intervention levels

One of the challenges regarding the issue consists in identifying the stakeholders according to their intervention levels and the environments in which they operate. Several categories of stakeholders emerge and are represented below according to their actions, ranging from the national to the local level. The different categories of stakeholders and the key actions they are undertaking are described in the following section **(see §** 7).

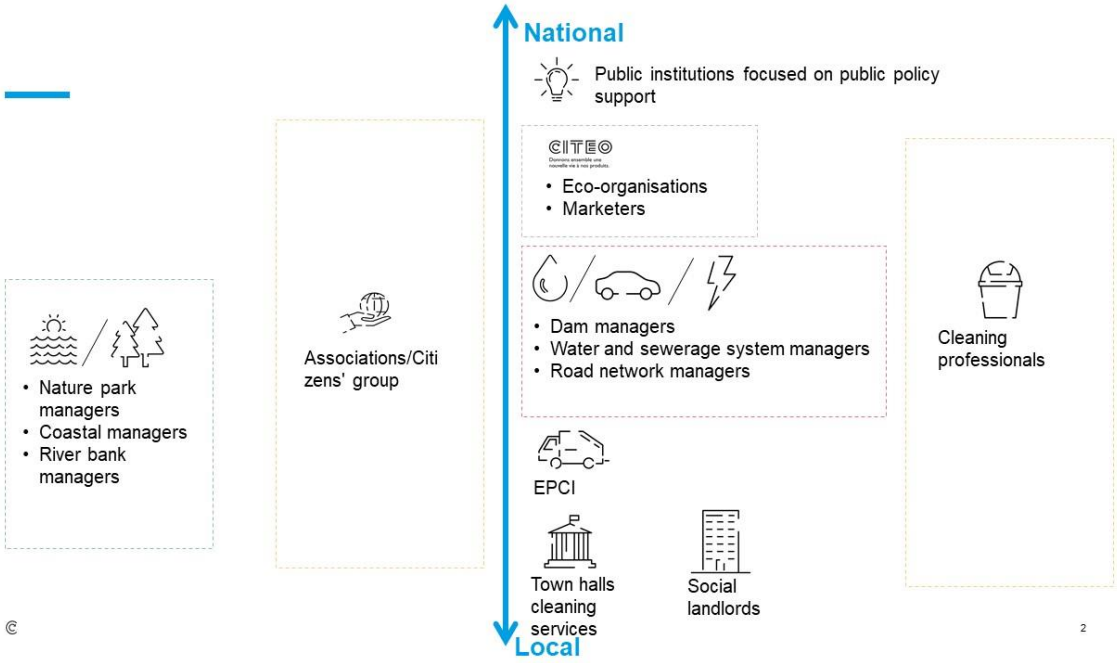

Figure 3. *Stakeholders categories mobilised by the littering issue according to their intervention level.*

2. Stakeholders' typology according to the areas of intervention and the actions carried out

We now need to describe the type of initiatives carried out as well as the areas of intervention for each relevant stakeholders. For this purpose, the environments were classified according to the "frequency density". This choice echoes one of the consultation's results. Indeed, 75% of the respondents consider that the site frequency influences the presence of litter (e.g. results of the online survey).

6. Mapping of relevant stakeholders

The following tables describe the three types of environment considered (e.g. **Erreur ! Référence non valide pour un signet.**) and the stakeholders position in each of these environments, according to the main initiatives undertaken (e.g. Table 2).

Table 1. *Description of the type of environment targeted and associated pictogram.*

Types of environments	Associated pictogram	Description
All settings		Takes into account all the environments listed below, regardless of the population density of the environment.
Urban & peri-urban environments		These are the areas with the highest population density, such as in cities or their outskirts. A town centre in a rural area can be included in this category..
Intermediate environments		These are environments that may have a fluctuating population density, depending on the time of year or day. Beaches or cultivated fields can be included in this category, as well as some less visited road networks.
Natural environments		These are the areas with the lowest population density. Natural parks or the marine environment can be included in this category.

6. Mapping of relevant stakeholders

Table 2. *Summary table of stakeholders on the littering issue according to the types of actions implemented and the targeted environments.*

	Develops characterisation methodology	Implement characterisation methodology	Prevention initiatives	Curative actions
Municipalities and EPCIs				
Associations / citizens' groups				
Nature Park managers				
Multi-managers of riverbanks				
Coastal managers				
Dam managers				
Water and sewerage system managers				
Road network managers				
Private managers				
Social landlords				
Cleaning professionals				
Waste management professionals				
Other professionals				
Eco-organisations				
Marketers				
Public institutions and expert group				

7. Overview of identified initiatives

The consultation has listed a range of approaches and initiatives in the three main areas identified in the fight against litter (e.g. Table 2). The main initiatives identified during the assessment are summarised in Annex 1 of the consultation report.

1. Categorisation of characterisation initiatives

a) What is characterisation?

Characterisation allows litter deposit estimation by focusing on elements such as the quantity or nature of the litter observed. **Characterisations** are essential to obtain an informed view of the litter issue. It must provide information on the origin of the litter, the route taken to better understand when it went out of the circuit and sometimes even information on the marketer (product category, type of packaging, brand, unit, material, etc.). They should also provide information on the nature of the waste studied, which can be classified according to the materials or the use to which they are put.

Characterisation is necessary to objectivize and quantify the nature and extent of the problem. The resulting information lays the ground to identify which coordinated prevention and clean-up actions can be made.

b) Methods typologies

The methodologies developed are intended to be as standardised and reproducible as possible in order to allow data comparison between different protocols in different environments. However, this comparison between different environments remains delicate. Given its exposure to the litter problem, the aquatic environment is the one for which the greatest number of methodologies have emerged. This is the environment where waste is transported on a massive scale, particularly during heavy rainfall, which triggers the leaching of soils and unauthorised dumps where these exist.

The amount of abandoned waste can be assessed mainly through two approaches:

- **Approach n°1 (based on "*top down*" estimates):** probabilistic, these estimates cross-reference the quantities of products placed on the market with estimates regarding the quantities of waste that go out from the conventional management circuit. These approaches often lack data and are very sensitive to the context of the analysed country (the rate of waste "leakage" will not be the same everywhere and depends particularly on the existence or not of a structured waste management system, etc.). These approaches therefore do not allow "leakage" mapping at the local scale and do not offer a fine analysis of the nature of the abandoned waste and the areas of preferential accumulation and/or generation of waste.
- **Approach n°2 (based on "*bottom up*" measurements):** these measurements, which are much more numerous than the previous ones, are based on field characterisation protocols to characterise the deposits on the basis of the waste found there, regardless of the

environment. Although these are the most widely used protocols at the moment, the lack of harmonisation of some of the protocols used makes it difficult to compile the results.

The reality (quantity, nature) of litter lies somewhere in between.

During this consultation, we were particularly interested in approach n°2, which allows for more finesse in the analysis.

2. Categorisation of preventive measures

a) What is prevention when applied to litter?

While waste prevention has been defined, the definition of prevention specifically related to litter has not yet been decided and appears to be multifaceted.

Waste prevention covers all actions that take place essentially before the waste even appears (in the sense of the Art 1er de la loi du 13 juillet 1992) or is taken over by a responsible entity, which together or separately make it possible to:

- Reduce quantitatively the waste streams that would have to be handled in this way;
- Limit the harmfulness of the waste itself and/or its treatment;
- Facilitate the elimination and, as a priority, the recovery of residual stream.

Prevention applied to litter covers a whole spectrum of actions, sometimes similar to those carried out as part of waste prevention. One of the objectives of this consultation was to identify and categorise actions that are being carried out in respect of litter prevention, the stakeholders who initiate and finance them, and the conditions under which they can be effective.

b) Methods typologies

Prevention when it comes to litter has two main components:

- **Upstream prevention**: in other words, thinking about the design and distribution of eco-designed products, avoiding unnecessary packaging or single-use objects, but also the eco-consumption lever, which is aimed more particularly at households.
- **Preventing the act of abandonment (downstream prevention):** aims to limit the “leakage” of litter into the environment, by acting on several socio-technical levers.

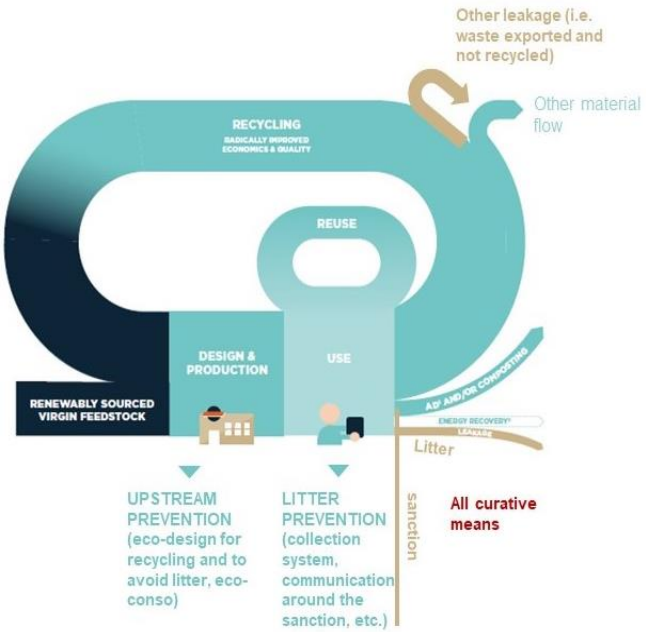

Figure 4. *Summary diagram of upstream prevention and prevention of littering (Ellen MacArthur Foundation, 2016)*

As part of this consultation, preventive initiatives regarding littering were categorised as follows:

Figure 5. Categories of initiatives corresponding to the prevention littering

3. Categorisation of curative measures

a) What are curative measures?

Curative actions are all measures implemented to collect litter, remove it from natural/urban areas where it should not be, and reintegrate it into an organised waste management system.

Curative actions are double-sided. Although they are often considered essential to increase the scope of preventive initiatives and avoid the excessive accumulation of litter, they are also criticised for appearing at the end of the scale and therefore would substitute for preventive actions. Moreover, they would not act as a strong lever for behavioural change. On the contrary, communicating too much on the existence of curative actions could send the opposite signal by making throwers feel

less responsible and opt for a reductive discourse such as: "*Why throw your rubbish in the bin if people are paid to clean it up?*".

b) Methods typologies

Among **these curative methods, a distinction should be made between:**

- **Active curative actions**: initiatives carried out in which there is direct human intervention in the cleaning of the various environments. Cleaning can be done by hand or mechanically.
- **Passive curative actions**: any initiative that does not require direct intervention by a person to pick up litter. Very often, these devices are installed at strategic points where the waste passes through, and they make it possible to retain it, thus creating an artificial accumulation area where it is possible to intervene afterwards for the punctual collection of litter.

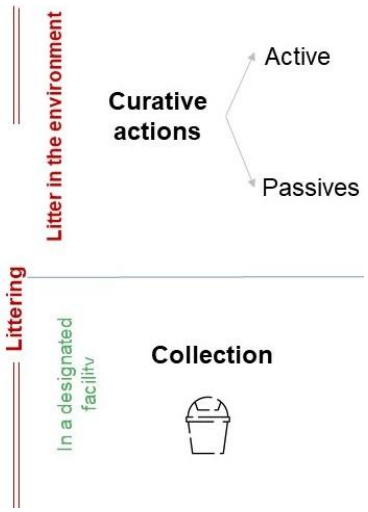

Figure 6. Distinction between the two types of initiatives in the curative sector

8. Main issues and lessons learned from the consultation

This section describes the main questions and lessons learned from the consultation, obtained by cross-referencing the contributions of the various sources used. These include the focal points on which there is a certain consensus (the points still the subject of debate is presented below). **They therefore reflect the views of the various stakeholders rather than those of the project team** (consisting of Ecogeos and Tehop).

The consultation was carried out by distinguishing **three main themes**: characterisation protocols, prevention of the act of throwing litter away and curative actions for the management of litter.

1. Main obstacles identified on the three themes

For each of the themes of the consultation, the work carried out enabled the emergence of obstacles, listed here according to the three themes.

01 Characterisation	• A disparity of environments studied which require different methods • A lack of awareness among operational stakeholders (municipal cleaning teams and volunteers) regarding the importance of characterisation • A lack of knowledge of existing tools by operational stakeholders • A lack of centralisation regarding available information, which is derived from a wide variety of existing protocols • A lack of human and financial resources to carry out more extensive characterisation campaigns
02 Prevention	• The absence of a territorial programme or strategy, whether it be at the national, regional or local level, to address the litter problem and to propose effective preventive measures • The time it could take to integrate a litter aspect into existing plans and programmes • Inconsistencies between regulations in different economic sectors, which make their application difficult (health and safety regulations require the use of packaging under certain conditions, whereas environmental regulations would like to limit it)

- A lack of centralised information regarding the multitude of existing initiatives and experiments carried out to assess their effectiveness in different contexts
- Lack of clear information on the current regulations which do not act as a social norms lever for throwers
- Lack of knowledge about the value of conducting diagnostics of out-of-home pick up systems
- Difficulty for communities to know what kind of communication tools to use to raise awareness among their citizens (and tourists) and where to find those tools
- A weak measurement culture among operational stakeholders who do not know how to evaluate the impact of their awareness campaigns
- Lack of consideration regarding behavioural science in the evaluation of initiatives

03

Curative actions

- The complexity of the territorial administrative disparities (notably the links between public establishments of inter-municipal cooperation and municipalities) and the sometimes-unclear distribution of competences within the communities, which makes it difficult to distribute responsibilities between municipalities and public establishments of inter-municipal cooperation
- The confusion of the responsibility regimes of the different public stakeholders whose perimeters cover the same environment (between municipalities and waterways or coastline managers, etc.)
- A lack of centralised information on the multitude of existing curative actions
- A weak culture of data feedback for operational stakeholders
- A lack of resources in cleaning departments, which have not all embraced the digital 2.0 revolution
- A lack of human resources within local authorities to monitor the impact of actions carried out on their territory and/or to carry out operations to identify accumulation points
- A lack of human resources and methodological framework within the communities to undertake regular cleaning measures
- A lack of methodological framework for undertaking curative actions coordinated with preventive initiatives and characterisation campaigns
- Lack of awareness of the environmental impacts of cleaning for operational stakeholders (consideration of the negative externalities generated by cleaning)
- The costs of cleaning are not well known and/or detailed for the municipalities, whereas this knowledge could make it possible to raise awareness, optimise the initiatives implemented and even undertake inter-territorial solidarity
- Lack of coordination between local authorities and associations to set up joint actions (before or after citizen clean-up operations, for example)
- A lack of coordination between local authorities and local stakeholders in a more general way, especially those who could act on the problem

resolution (public space managers, research laboratories, retailers, citizens' movements, etc.)

- Sometimes a difficult contact between local stakeholders
- Lack of work recognition by the stakeholders on the ground
- Resistance from users of natural areas to the use of certain cleaning methods that have less impact on ecosystems (manual cleaning, maintenance of the seagrass or the tide mark, etc.)
- Cleaning standards that are sometimes very high, especially in urban areas, which require very thorough curative actions (water jet cleaning, very frequent visits, etc.)

2. Consensus and emerging lessons from the consultation

For each of them, the work carried out has made it possible to reach a consensus, which is presented here according to the three themes.

01

Characterisation

How to define a characterisation methodology and how to judge its effectiveness?

The stakeholders proposed to segment the places to be characterised into three types of points which allow to better structure the actions to be considered.

- **Accumulation points** or "black spots" are places where litter regularly accumulates, due to currents, winds, etc. In order to identify them, a "simple" characterisation (i.e. geolocation and an overall estimate of the amount of litter present) is required. Identifying these places helps to optimise the cleaning of these spaces.
- **The measurement points** are the locations that need to be monitored/characterised on a regular basis in order to try to get a picture of the litter on a territorial scale. The resulting data must be relatively accurate because it will serve as a basis for recommendations that could be made both to marketers (e.g. eco-design) and to local stakeholders (e.g. adaptation of the collection system). A measurement point can be located at the same place as an accumulation point.
- **The action points** are the places where the effectiveness of passive or active curative actions can be measured.

Stakeholders agreed that campaigns **to identify accumulation points** where cleaning action is required on a regular basis are a priority.

Stakeholders agreed on the need to conduct **characterisation** operations **manually, with the help of digital tools** when it is relevant.

The frequency of characterisation operations should also be taken into account in order to **synchronise characterisation campaigns with cleaning operations**.

Two criteria were used to evaluate the effectiveness of the characterisation protocols, namely their **adaptation to the relevant environments** and the **accuracy level of the collected data** by these same protocols.

As each area has its own needs and different perceptions of the littering problem (both from elected representatives and residents), it was proposed that **these characterisation measures be complemented by sociological measures** to assess consumers' perceptions and attitudes towards litter.

How can stakeholders be encouraged to carry out characterisations?

Numerous initiatives have been identified to overcome the mentioned obstacles:

- Better coordination of the stakeholders on the ground (municipalities and associations) and consequently more information flow;
- Municipal teams training to raise awareness regarding characterisation but also prevention;
- Raising awareness on data collection and reporting among field stakeholders;
- Recognition of the work done by the stakeholders on the ground.

Other levers were mentioned by some stakeholders. For example, including the characterisation of litter in the territorial programming, or even in the strategy of the catchment areas, or of identifying the types of litter that are over-represented on a local scale in order to act on this flow more precisely.

02

Prevention

At what scale(s) should prevention measures be implemented? - focus on awareness campaigns

Stakeholders agreed that national awareness campaigns were not sufficient to raise citizens' awareness and that they should **necessarily be complemented by more local campaigns**. Several communication levels (local and supra-local) should therefore be planned in a complementary manner. However, both national and more local campaigns need to have consistent messages.

The need to design awareness-raising campaigns **taking into account people's distrust of institutional messages** was mentioned. This mistrust can be an obstacle to behavioural change and makes it all the more necessary to **have local relays** whose messages are better received by part of the population. At the same time, it appeared relevant that awareness campaigns conducted at the local level should be part of a broader national policy to fight against abandoned waste, in particular to facilitate the work of municipalities that would not want to communicate on the subject for fear of stigmatising their citizens or highlighting the supposed dirtiness of their territory.

Participants expressed support for structured local plans for the prevention and management of litter, as long as a methodological framework is provided. They were also encouraged to involve other stakeholders.

It was also mentioned that the Regions could integrate litter prevention in their Regional Waste Prevention and Management Plans, but also encourage public establishments of inter-municipal cooperation to do the same in their Local Plans for the Prevention of Household and Assimilated Waste (through assistance, advice, financial support, etc.).

The proper dissemination of awareness-raising tools to operational stakeholders is a key element of support for these stakeholders. The materials must be **appropriable and customisable**. Personalisation is important because it addresses the political visibility issue. However, the "turnkey" kit format should not be the only answer as they are not "contextualised".

What content for prevention messages?

The question of the messages content to be conveyed was discussed and several approach angles emerged, including the need to:

- Educate people about the litter route and explain the negative impacts in environmental and financial terms, etc.;
- Show which behaviour is relevant.
- Explain the usefulness or even legitimacy (associated with the social norm) induced by good behaviour.
- Deconstruct preconceived ideas (littering is not always the result of a voluntary act);
- Explain not only "how to do it" but also "why to do it».
- Prefer dialogue and mediation to punishment, in order to raise awareness.

Is there a priority audience?

In addition to the messages, it was recommended not to consider a priority audience as such, but to address different types of audience in a differentiated way.

Is the communication around the sanction effective?

It was recalled that **communication around the sanction** is part of litter prevention, but it has some limitations. **The sanction itself can be counterproductive, as it disconnects the user from his goodwill and therefore from his individual commitment**: the user thus carries out a 'good' action because he is afraid, not because he is convinced that it is the 'right' thing to do. In the long run, the 'good' action is less likely to be sustainable than if the individual is taking it in good faith - and even more so if the perceived risk is reduced. This is why this type of communication might not therefore create lasting awareness.

It seems essential to deploy a discourse that reminds us of the punishment incurred, but rather emphasises the responsibility of individuals while giving meaning to the virtuous gesture that is expected. Some stakeholders mentioned the return to a so-called "ecological" civic service to overcome the financial aspects of the ticketing process which can be made difficult in the case of non-sworn brigades. It would then be a matter of getting throwers to take part in supervised clean-ups to raise their awareness and they then would serve as awareness-raising relays.

How can the effectiveness of preventive initiatives be measured?

Measuring effectiveness seems relevant in order to recognise which measures are to be recommended in which context, to know how to improve certain initiatives that do not seem to be working or simply to ensure that the resources committed are used wisely. The operational stakeholders of the associations specified that it was necessary for them to be able to **demonstrate that the methods they use work**, particularly in view of changing their practices if they were found to be ineffective**.**

It **therefore seems necessary to ensure from a qualitative point of view that preventive actions have a positive impact on citizens' attitudes towards litter and, where possible, to complement them with a quantitative analysis of the waste stream before and after the implementation of preventive initiatives.**

In implementing this dual quantitative and qualitative approach, field surveys should take into account many contextual factors in order to achieve reliable results. This system is therefore considered to be costly and complex for the local authorities which would be the structures most likely to carry out such assessments and which do not yet have sufficient methodological support to carry out this kind of process. The possibility of involving participatory science was raised to address this issue.

However, it would seem appropriate to use this methodology for a few representative cases and to build or refine a methodological toolkit on the basis of the collected results intended for other territories. The latter will be able to use this toolkit to monitor the resources committed to fight against litter.

03

Curative actions

What are the relevant costs to meet stakeholder needs?

Throughout the consultation, the need for training was highlighted, particularly because there is very little training specific to curative approaches. However, they would be necessary not only to pass on knowledge about the most effective initiatives with the least possible impact on ecosystems, but also to ensure that the teams in the field have the necessary skills and that their work is acknowledged.

This increase in skills is also taking place at a time when municipal cleaning services are increasingly being pushed towards the use of connected tools, in the context of *Smart Cities*. Limits to this development have been noted, such as the risk of agent surveillance that could be misinterpreted, or the costs associated with these new technologies (financial cost for have access to these technologies, human cost of analysing the feedback on the "field" data through these tools).

How can knowledge about cleaning costs can be increased?

Costs are at the heart of the considerations that need to be made when choosing which initiatives to put in place. Although the addition of a "litter" section in the municipalities' analytical accounting has been mentioned, it seems difficult to implement, as the actions carried out in the "curative" section are so numerous and have different objectives (the same "man-time" could be dedicated to road cleaning, leaf collection, etc.). However, the creation of a cleaning cost benchmark, following the example of the benchmarks launched by the ADEME (Agency for ecological transition), could provide a clearer picture. The objectification of costs could also be used to reflect on the cleaning costs borne by certain territories subjected to significant accumulations of litter from downstream territories.

Which type of financing should be implemented to cover part of the litter clean up costs?

Participants considered standardised financing counterproductive. The diversity of local situations with regards to cleaning is highly difficult to reflect through an allocation which would be solely based on the population criteria. For instance a municipality with few inhabitants can suffer a lot from litter produced upstream in the catchment. This municipality will get fewer financing although it does not have any technical, financial, human resources to deal with that. In addition allocating financing without having any look on the actions that will be implemented does not guarantee that the amounts will be allocated to efficient and proven actions to fight litter. Such a financing might not be up to the challenge that litter fighting represents.

In the same vein, a system equivalent to eco-modulation and that would depend on the sales of each category of product would not be adapted either. Indeed, the financing model should not be based on the hypothesis that each product has a probability to be littered as it could alter the perception of the consumer, by giving him the feeling that because cleaning is already included in the price, his behavior should not evolve.

Towards a generalisation of plans to fight against litter including a curative component?

The issue of local plans to fight against litter was raised with stakeholders during the discussion sessions. They are unanimous on the fact of integrating a "curative actions" section into this type of plan, which would need to be refined but could be based on a structure that takes up the idea of a diagnosis prior to the selection of actions and the evaluation of their impact.

Municipalities could be encouraged to adopt such a methodological tool, as long as they are supported. The format of a call for projects with funding was also mentioned to encourage the most motivated communities to get involved while providing them with the means to do so.

How can the effectiveness of curative methods be assessed?

For the stakeholders, **the effectiveness of curative actions requires a compromise between technical innovations and human resources**, which remain essential. The use of digital tools can support municipal teams and associations in their interventions, particularly because they allow detailed monitoring of the streams collected and can integrate contextual factors, but it should not replace them. This use by the agents can be enhanced and give meaning to the cleaning teams' tasks, provided that they are involved in their deployment beforehand.

Stakeholders stressed the need to rely on local knowledge to contextualise the data collected during the evaluation of curative actions.

How to limit the environmental impact of curative methods?

Litter is detrimental to biodiversity if it remains in the wild but also potentially when it is cleaned up. Also, in some cases, cleaning methods can have a negative impact on the surrounding ecosystems:

- **Manual collection:** nuisance for biodiversity and intrusive actions in some protected areas (e.g. nesting areas). Some collection actions (voluntary or carried out by local authorities) may not be aware of these aspects;
- **Mechanical collection**: mechanical screening of beaches, settling of sediments, removal of the tide mark.

Stakeholders agree on the negative impact of some mechanised cleaning methods on the environment and biodiversity. They pointed out the importance:

- To avoid the use of these methods as much as possible;
- To improve the circulation of information between the stakeholders who act on these environments, in order to limit successive cleaning operations, in the same places and at very short intervals, in particular during nesting episodes, for example;
- To increase knowledge of their effects on the natural environment;
- To take into account the environmental impact of actions when assessing their effectiveness;
- To make the users of the targeted environments aware that systematic cleaning can be negative and that the presence of the tide mark or seagrass does not necessarily imply the initiation of an active curative action. However, it was pointed out that many municipalities are reluctant to implement these recommendations (a "hygienic" view of nature still prevails). The removal of waste, whatever its nature, is still too often the priority of municipalities that are not very aware of the issue and that adjust their arrangements to their constituents demands.

With regard to so-called "passive" curative measures, recent publications show that shores and foreshores are plastic pollution pits that could be equipped with waste retention facilities. Some communities are considering rethinking the vegetation of the foreshore to capture this diffuse litter in

the event of a storm. This way, vegetation could play a passive and natural curative role in retaining macro-waste.

What are the necessary levers for the coordinated development of curative actions?

In order to remove the identified obstacles, several levers have been formulated:

- Carrying out a preliminary assessment through characterisation, by setting criteria related to the degree of risk regarding impact on biodiversity / aesthetic aspects / citizens feelings;
- Drafting of guides, by type of environment, on the reasoned cleaning and low impact on the ecosystems, following the example of the guide on the subject published by the *Conservatoire du Littoral*;
- Synchronisation of curative actions with characterisation and preventive actions as part of local litter control plans;
- Coordination of actions carried out by municipalities and associations, notably through a Vademecum of good practices;
- Deployment of environmental mediation as an coordination aid between operational stakeholders but also with the users of the areas targeted by curative actions;
- Incentives to take biodiversity into account in cleaning practices, for all operational stakeholders;
- Encouraging and supporting the use of digital tools by municipal teams and the stakeholders involved in the litter collection;
- Creation of indicators for monitoring and evaluating the actions effectiveness;
- Supporting municipalities in estimating their costs and evaluating the results of their actions;
- Financial support to operational stakeholders.

3. Cross-cutting lessons

a) A dual approach to be adopted (geographical and socio-economic)

Participants in the consultation often expressed the need to adopt a cross-sectional approach, **both geographical (regarding streams location and quantity) and socio-economic (regarding streams origin)**. This dual approach requires the use of both contextual data and data from behavioural science experiments.

However, only some local authorities have the means to use behavioural sciences, hence the interest in sharing their experience with a view to disseminating knowledge from the actions carried out by local authorities that are pioneers in this type of commitment.

It would also be interesting to identify the pilot municipalities involved in cross-cutting approaches with dedicated action plans and to experiment with an evaluation methodology with them to go beyond the resources indicators. This methodology could be created by a **committee of competent stakeholders**, supported by a multidisciplinary technical council.

b) Development of structured strategies to fight against litter

The **majority of** stakeholders were in **favour of encouraging local authorities to develop structured local plans to fight against litter**, as long as a methodological framework is provided and that a number of local stakeholders are involved.

A local plan to fight against litter could include a diagnostic stage of the local situation in terms of litter production and accumulation (notably through a mapping of accumulation areas) and list the preventive and/or curative initiatives already carried out, thanks to the detailed understanding of the territorial context. A plan of preventive and/or curative actions, mobilising also complementary levers, will thus result from the diagnosis made.

The concept of a structured plan is interesting, but it can be politicised, even instrumentalised, or can suffer from a lack of dissemination. Coordination and inter-knowledge between local stakeholders are therefore essential and require dialogue before actions can be co-constructed. Many local authorities are already aware of and committed to the issue, but they now need a strategy to rationalise the use of their resources, rather than a scattering of resources that would not fully meet the needs, due to a lack of sufficiently in-depth initiatives.

c) A need for a necessary centralisation even if the format has yet to be found

Many stakeholders have observed a lack of information flow and feedback. **Stakeholders were therefore very much in favour of a national centralisation of tools and good practices in the fight against litter.** It would be possible to develop a decision support tool through a search engine adapted to the stakeholders needs. Entries could also be proposed according to the user's profile (local authority, associations, companies, schools, etc.) in order to facilitate feedback regarding more relevant experiences. While the idea of centralisation is welcome, because it would help decision-making, the format was debated and it was pointed out that the reporting would be very time-consuming (e.g. § 8.4).

In order to support the platform, the participants were in favour of **appointing a neutral stakeholder, able to install a** collaboration between institutional stakeholders.

It was also pointed out that it was necessary to remain very pragmatic and close to the problems on the ground. Finally, it was proposed that a scientific committee be set up to monitor the process and evaluate the effectiveness of the actions listed.

d) Digital tools need to be mobilised in a cross-cutting manner

Digital tools can be **used for characterisation, identification of littering sites, and monitoring the effectiveness of preventive and clean-up initiatives**.

Several stakeholders (research organisations, private companies, local authorities, associations*)* are already using digital tools which allow them to characterise and monitor the observed streams but also to identify the main areas of waste accumulation, among others things

The use of digital tools could **support operational stakeholders** in their interventions, provided that these tools are adapted to the profession of the stakeholders carrying out this monitoring (who sometimes has other missions in parallel). These resources could enhance **the value of field operators by making them information collectors, without significantly interfering on their work**.

4. Points to watch out for

This part aims to warn off important points to watch out for, regarding proposals that have not been the subject of consensus or questions that are still pending, and which may need to be examined in greater depth before a collective strategy can be reached.

This section is as exhaustive as possible, while recognising that some of the marginal issues raised throughout this synthesis may not have been included here in detail.

a) Relevance of estimating the total amount of litter

It was noted that estimating the total amount of litter would be particularly **complex and time consuming**. This objective is therefore not a priority to begin with and an estimate at the local level would be sufficient at this stage to take action.

b) Consideration of the porosity of human-altered/natural environments in catchment areas

An association working at national level called for a **nuance in the distinction between human-altered and natural environments**, citing the example of a river running through a city. The distinction made here (e.g. The following tables describe the three types of environment considered (e.g. **Erreur ! Référence non valide pour un signet.**) and the stakeholders position in each of these environments, according to the main initiatives undertaken (e.g. Table 2).

) has the merit of being based on data on the number of people visiting places, which is more easily objectifiable, but does not take into account the micro-local scale (the river running through a city). It would be important to clarify this question of the environments targeted, but also that of waste streams between urban, natural, river and marine environments, etc., in order to strengthen solidarity between territories in the same catchment area and thus be able to define responsibilities. A stakeholder from a regional council noted that there is still too little coordination between stakeholders at the catchment areas level.

c) Standardisation of characterisation methods

A paradox has emerged regarding the characterisation methods to be developed and promoted to the relevant stakeholders: it **is necessary to have the most homogeneous data possible** to be able to compare the territories between them and to conceive adequate strategies for the reduction of the litter impact, however:

- Many stakeholders are already involved at the local level (particularly in associations), with their own objectives, methods and tools.
- Urban and natural environments are very diverse: landscape characteristics, access constraints, different regulations, etc. The stakeholders who carry out characterisation campaigns have therefore often developed methodologies adapted to these environments but also to land constraints (coastal and river environments, isolated natural environments, human-altered environments, etc.) and to the resources at their disposal.
- Characterisation is usually carried out by teams of volunteers, as part of clean-up operations organised by associations. The methods are therefore simplified as much as possible, so as not to discourage the participants.

Several stakeholders felt **that the existing methods correspond to different objectives** that co-exist, making it very difficult to develop a unique protocol.

Most stakeholders believe that bridges should be found between the protocols to achieve this cross-cutting vision that is currently lacking. Some stakeholders therefore stressed that it was **not necessary to implement particularly detailed protocols** to produce a fine analysis of the present waste.

- **Build on what exists**: develop a flexible common data recovery protocol, with a streamlined waste typology. This protocol would be based on existing methods, identified and enriched if necessary, in conjunction with the experts in each environment. It would strengthen the work carried out by operational stakeholders by linking existing inventory and

characterisation initiatives. This protocol would allow the method to be adapted to the field, while producing standardised and credible data. This remains the majority position.

- **Prioritise the homogeneity of data**: define a new method, a single standardised protocol for all characterisation operations, applicable to all environments, to collect homogeneous data.

Lastly, characterisation does not seem to be essential to carry out curative actions: it is possible to carry out regular observation at the measurement points and then to carry out a characterisation following the cleaning actions.

d) Centralisation of data and initiatives

The participants stressed that a centralisation of methodological feedback would be interesting for all three strands: it would provide common elements for actors to draw on and be inspired by before launching any particular initiative or evaluation measure.

One of the centralisation formats mentioned is a single online platform. This proposal was subject to dissent:

- **The development of a single public database**, fed by all operational stakeholders (and not only), was supported by some but ultimately considered utopian, due to its complexity and time-consuming nature.
- **The development of an interface between existing** databases was mentioned, particularly in the area of characterisation. The fact that these databases should be interoperable and compatible convinced the majority of stakeholders, who nevertheless highlighted the difficulties of implementation to be anticipated: resources to be devoted to feeding and analysing the data, possible reluctance on the part of stakeholders to make their data public, etc.

According to several participants from the associative world, the main challenge is not to centralise good prevention practices (many tools already exist), but to **facilitate their access and use, and to encourage stakeholders to use them** (communication, field activities).

Rather than a single centralised system, stakeholders favoured a **federated system,** which would bring together data and practices from 'decentralised' experiences across the territory and share information, while remaining flexible. In this "federated" system, everyone would remain free to try out new methods, depending on the environments observed, and could commit to providing a certain amount of information on the implemented methods in a predetermined format, common to all, allowing the data to be shared.

e) Opening up digital tools to various audiences

Compiled data advertisement was discussed. It depends on the data suppliers, who may sometimes charge for them, and on the structure that supports the common database (State, association, etc.). This structure will need to be mandated in order to compile data that could be made public once analysed and validated.

The time it takes to integrate the data must be taken into consideration: according to a research laboratory, it could take 2 to 3 years before the data is made public. In addition, **stakeholders will require access to data with variable geometry**, due to the urgency of the problem.

It is also crucial to take into account **the political and economic issues associated with the dissemination** of sometimes sensitive **data**. In particular, there may be strong political issues related to data that emphasise the cleanliness/soiling of a place/natural area and could degrade its image.

The relevance of making such data public was therefore questioned, in particular because of the time that would be needed to verify, homogenise and *ultimately* disseminate the data, but also

because of its potentially sensitive nature. The time required to disseminate the data does not seem to be compatible with the urgency of the problem.

f) Priority target audiences for communication actions to prevent littering

For many participants, **raising awareness among schoolchildren** is the first action to be taken, in a framework of education for citizenship. Raising awareness in schools is interesting because children are a vector for raising awareness among families, based on the idea that the child influences the parents' behaviour. Moreover, raising children's awareness is an essential part of shaping the future adults they will become.

However, those who disagreed felt that the initiative placed the responsibility for virtuous behaviour on children rather than adults, even though children are not the main producers of litter.

Two distinct positions emerge from this:

- Raising awareness among school audiences is the first initiative to be undertaken, since children are a vector of awareness for families.
- There should be no priority audiences but differentiated communication methods with an engaging and educational discourse for all. The public and the litter problem would be targeted at local level, based on the results of the characterisation exercise. The speech used should also favour dialogue and mediation rather than punishment.

Both positions were supported, even if the second one eventually won over a majority of stakeholders.

g) Division of competences and liability regimes

The participants noted several obstacles to the deployment of corrective actions:

- The complexity of territorial administration and the fact that the division of competences is sometimes unclear;
- The confusion of liability regimes between different public stakeholders with overlapping perimeters.

Many stakeholders are involved in carrying out remedial actions (mainly municipalities and EPCI (a public establishment for intermunicipal cooperation) associations, public managers of natural environments, etc.). These stakeholders can intervene on the same territory, simultaneously, with or without coordination.

The division of competences between public (or even private) stakeholders can sometimes be unclear, particularly for certain intermediate areas, located between urban and natural environments, such as rivers or roadsides. Stakeholders pointed out a lack of communication, and sometimes even **tensions within local authorities** (between EPCIs, responsible for waste collection and recovery, and municipalities, responsible for the cleanliness of public spaces). It is possible for municipalities to transfer their waste management responsibilities to EPCIs, but this is rare.

The distribution of responsibilities between private or public managers and local authorities is currently entangled and multiform depending on the territory. It is therefore difficult to identify the relevant stakeholders on the subject of litter.

9. Conclusions and future development directions

Littering is a multi-faceted issue, both in terms of the way it emerges and the number of initiatives that exist to stop it, or the diversity of actors that carry them out. In fact, there are multiple and complex causes for the presence of this waste. There are many different strategies to fight against littering and they must be implemented in territories where the magnitude of the problem is not the same. These initiatives are also led by a large number of stakeholders who do not have the same motivation.

The purpose of this consultation was to identify existing efforts as well as the stakeholders behind them, and to study the extent to which this complexity can be better understood in order to support increasingly effective global approaches. Although the subject has been dealt with according to the three aspects that structure the problem, it turns out that they are very intertwined and therefore deserve to be **considered** in a **transversal manner.**

Curative actions are those mainly carried out by all types of stakeholders, as shown by the mapping of initiatives (see § 6.2, Table 2). Although they are often involved in data collection and can support prevention efforts, they are only involved at a very early stage of the litter problem. With limited resources and a complex problem, they do not appear to be viable single solutions to the issue of litter pollution. As stated in a recent report by the Office parlementaire d'évaluation des choix scientifiques et technologiques (2020), there is no point in mopping up overflowing water if the tap is still running. It is therefore important to change the paradigm in the fight against diffuse litter by taking the problem from a more upstream, but also more transversal, angle.

In order to act further upstream, **prevention actions** must be more visible and effective, with multi-level approaches:

- Preventing waste at source, which is at the heart of recent measures taken at European level concerning the elimination of certain single-use plastics, for example, or innovations in terms of eco-design;
- Make sure that the waste management system limits waste leakage by putting in place appropriate collection systems and procedures.
- Prevent the end-user from abandoning his or her practices, in particular by explaining the reasons for this action and the levers for undertaking a profound change in these practices.

However, these approaches, although targeted, require a minimum of consistency to be effective. This is where the **characterisation campaigns** come in, not only identify the areas of accumulation most at risk, but also to assess the initial situation in order to adjust the initiatives to be put in place. This is where the characterisation campaigns come into play, not only to identify the most at-risk accumulation areas, but also to assess the initial situation in order to adjust the initiatives to be implemented. While a more objective characterisation is essential, it must also be supported by psychosocial assessments to better understand the contours of abandonment and the levers needed to eradicate it.

This cross-cutting approach provides a guideline for possible plans to combat litter, to be refined and adapted to local circumstances, both in terms of the intervention environments and the stakeholders to be mobilised to solve this systemic problem. The stakeholder issue is crucial. While many stakeholders are already involved in the fight against litter, it is important to note that only a collective effort can overcome the problem (Clean Europe Network, 2015).

While many stakeholders are already involved in the fight against litter, it is important to note that only a collective effort can overcome the problem (Clean Europe Network, 2015). They are presented here according to several aspects.

01 **Techniques**	• Addressing the issue of tackling litter in a cross-cutting manner • Reflect on how to structure plans to combat littering • Evaluate the impact of initiatives. • Centralise feedback in a format yet to be defined
02 **Organisationnels**	• Coordinating stakeholders at local level, but also between local and national levels • Promote the flexibility and agility of teams in the field by working in particular with local stakeholders and making clear "who does what? “ • Train and support the stakeholders to use the tools available to them • Promote the sharing of transdisciplinary experiences on the subject through the organisation of symposiums combining scientific and empirical expertise on various environments
03 **Environmental**	• Promote in-depth local knowledge in planning actions to be implemented so that they are locally adapted • Promote initiatives that do not have negative impacts on the environment and biodiversity
04 **Financials**	• Increase knowledge of costs for better anticipation of resources and optimising initiatives • Reflect on a method of financing that is equitable (in terms of addressing the scale of the problem) and that ensures the effectiveness of initiatives (in terms of measuring results).
05 **Social**	• Involve all stakeholders in the fight against litter, from marketers to communities and citizens • Promote the exemplary nature of local authorities, which can commit themselves through charters or labels • Involve and raise the awareness of the general public by supporting the initiatives of local stakeholders (local authorities, managers of public spaces, associations, retailers, etc.)

10. Glossary

Curative actions		Curative actions are all measures implemented to collect litter, remove it from natural/urban areas where it should not be, and reintegrate it into an organised waste management system.
Active curative actions		Active curative actions correspond to initiatives where there is direct human intervention in the cleaning of the various environments. Cleaning can be done by hand or mechanically.
Passive curative actions		Passive remedial actions do not require direct intervention by a person to collect litter. Very often, these are devices that are installed at key points of transit for this waste and which allow it to be retained, thus creating an artificial accumulation zone which can then be used for the collection of litter.
Characterisation		These are protocols for estimating the amount of litter by focusing on elements such as the quantity or nature of litter detected.
Littering		According to ADEME (French Environment and Energy Management Agency) (2019), litter is "Waste improperly dumped in the environment". It is made up of waste that has escaped the collecting process and is thus found in places that are not designed to handle it (roads, natural areas, aquatic environments, etc.), thus having a de facto environmental impact on the environments concerned.
Environments	***Urban and peri-urban environments***	These are the areas with the highest population density, such as in cities or their outskirts.
	Intermediate environments	These are environments that may have fluctuating population densities, depending on the time of year or day.
	Natural environments	These are the areas with the lowest population density.
Points	***Accumulation points***	Also known as "black spots", these are places where diffuse litter regularly accumulates, due to currents, winds, etc. to identify them, a "simple" characterisation is necessary. Identifying these places helps to optimise the cleaning of these spaces.
	Measurement points	These are the locations that need to be monitored/characterised on a regular basis in an attempt to get a picture of littering on a territorial scale. The resulting data must be relatively accurate as it will form the basis for any future recommendations that may be made. A measurement point can be located at the same place as an accumulation point.

Action points	These are the places where the effectiveness of passive or active curative actions can be measured.
Prevention	While waste prevention has been defined (in particular, the first definition was provided by Francis Chalot as early as 2001), the definition of prevention specifically related to littering is not yet settled and seems to be multiform. It covers a whole spectrum of actions, sometimes similar to those carried out in the framework of waste prevention (upstream prevention and littering prevention).
Extended Producer Responsibility	The principle of extended producer responsibility (EPR) has existed in law since 1975 and is codified in Article L. 541-10 of the Environmental Code, which states that " *producers, importers and distributors of these products or of the components and materials used in their manufacture may be required to provide for or contribute to the elimination of the waste arising from them*. "

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Annexes

Annex 1 - Detailed methodology of the consultation

1. Methodology for carrying out the assessment of the situation

This inventory is a collection of methodologies and initiatives related to the problem of diffuse litter. Because the subject is so vast and is carried out by countless stakeholders at very different levels, it has not been possible to list all the existing initiatives in detail. **It is important to note that this document is not intended to be exhaustive, but rather to centralise information on the various actions identified** in order to be able, in parallel with the interviews and discussion sessions that were held, to draw up a more complete assessment of the situation, which should make it possible to highlight the essential practices, the avenues of development to be pursued, and the pitfalls to be avoided.

The assessment presented here **was mainly based on bibliographical research carried out through Internet search engines**, leading to a slight bias in favour of structures at national level, which have more means of communicating about their actions, to the detriment of local associations which sometimes communicate less on the subject. Therefore, the research sought to target the websites of these local associations in more detail to ensure that their initiatives were included as much as possible. However, the keywords used in the searches mainly targeted the "littering" entry, sometimes leaving out more generalist environmental protection associations that raise awareness but do not specifically target this type of waste.

The research focused mainly on the national perimeter. However, relevant international initiatives have been selected on a more selective basis. This bibliography consists mainly of research or study reports, Internet pages (press articles or publications of associations) but also presentations from conferences or various events. The documents identified were written by a variety of Stakeholdres: local authorities, associations and citizens' groups, research centres and laboratories, professionals in the field, etc. Finally, the information in these documents is relatively recent, having been published over the last 10 years, although most of it focuses on the years 2019 and 2020 (see Figure 7). This is partly due to the increased attention given to the issue of 'plastic' waste.

Figure 7. *Word cloud from the bibliography.*

For **each initiative identified, the objectives, method, stakeholders, costs and means as well as the results were presented.** A benefits/limitations table summarises this information. The costs, as well as the long-term effectiveness of some initiatives, have been particularly difficult to find in some cases. For this reason, this report has been supplemented with targeted information from the various experts consulted throughout the consultation process. This targeted information thus made it possible to deepen and enrich the bibliographical research carried out.

Photographs, screenshots and extracts from reports have been included in this review to make it easier to read. The sources have always been cited in a rigorous manner in order to value the work carried out in the various entities mentioned.

The entire bibliography was referenced and then stored using **Zotero**. A **bibliographic database was also compiled according to the three main themes of the consultation:** the characteristics of litter, the prevention of littering, and remedial measures.

2. Expert Consultation Methodology

2.1 Aims of the interviews

Semi-structured interviews provide a format for case-by-case exchange and **encourage the collection of complete, well-reasoned and original information**. Given its relatively open-ended format, this type of tool makes it possible to delve more deeply into the specific issues at stake for each respondent, while at the same time giving them the opportunity to share personal opinions, anecdotes and feedback that would be more difficult to obtain through a bibliographic collection.

In concrete terms, the interview's purpose was to:

- Clarify the **definition of the research subject**, i.e. litter;
- Validate / **refine the information gathered** through bibliographic research and according to the fields of competence of the experts interviewed;
- Develop **feedback**, in particular by asking respondents about their knowledge of situations and problems concerning the three subjects of the study, namely characteristics, prevention and curative actions;
- To gather **opinions and prior positions on** the fight against litter and more concretely on some key actions carried out by the different stakeholders in the sector;
- Requesting **additional documentation/contacts** that may help in identifying the most relevant interlocutors for the debate sessions**.**

The interviews carried out allowed us to go into more detail on the subjects dealt with in the assessment by questioning the experts differently according to their fields of competence, whether it be characterisation, prevention or management (including curative actions, collection/routing and treatment).

2.2 Identification of experts

After identifying the stakeholders who are more or less concerned by the littering issue, we built up a database of contacts from which we drew up an initial list of experts on various aspects. In a second step, this list was completed with new specific profiles.

The choice of stakeholders to be interviewed was made to **ensure that the expertise mobilised** was representative, in consultation with Citeo. The list of experts called upon is presented in the table below.

2.3 Transfer of interviews

A dozen stakeholders were asked to conduct semi-structured interviews in order to address the points in the interview framework presented below. The use of this framework **ensured that all**

relevant topics could be addressed in the exchanges. The semi-structured format applied allowed **sufficient flexibility** for the experts to express their views more freely.

Summary points constituting the interview framework

- What is your definition of litter?
- What is your view on the evolution of littering in the last 5 years? Do you have any figures on the subject (typology and tonnages)?
- What do you think are the best levers to fight littering? Can you describe them (human, material and financial resources)?
- Based on the previous question: In terms of prevention/cleaning, do you see other effective levers to fight against littering?
- Do you know of an effective method to classify litter? Can you describe them (human, material and financial resources)?
- Why do you consider this or that method to be more effective? What do you mean by "effective"?
- In your opinion, what would be the 2/3 success factors found in the key actions you have mentioned?
- On the other hand, do you know of any control actions that did not work? Do you know why? What levers of intervention could have made the action more effective?
- What do you think are the main limitations of a litter abatement approach?
- What do you think operational stakeholders need in terms of preventive and curative actions against litter?

The interviews will take place during the months of September to November 2020. The selected stakeholders were initially contacted by e-mail, and some were contacted again to make an appointment for a telephone interview. These interviews **lasted on average 1 hour, with the longest lasting up to 2.5 hours.**

The interviews were conducted by two members of ECOGEOS alternately asking questions to the expert. Only one expert was interviewed in each interview, with the exception of interviews 8 and 11. Interview 8 was conducted with two experts from the same entity: the first was in charge of the issue until the end of 2019, when he handed over the file to his successor. Interview 11 was conducted with two urban cleanliness experts working in different territories.

Table 3. *Review of the interview process*

Maintenance no	Date of interview	Area of expertise
1	02/09/2020	Local approaches to prevention and the challenges of the DROM-COM
2	04/09/2020	Psychology and local prevention approaches
3	04/09/2020	Characterisation plan for diffuse litter and littering
4	07/09/2020	Local authorities and waste competences
5	09/09/2020	Central government, local government, and EPR
6	10/09/2020	EPR channels
7	17/09/2020	Litter prevention
8	17/09/2020	Public authorities and EPR schemes

9	02/10/2020	Co-construction of public policies and methods for characterising litter
10	04/12/2020	Marine waste, circular economy and plastic advocacy
11	08/12/2020	Cleaning service management

3. Methodology for conducting the online survey

3.1 A variety of stakeholders to be taken into consideration.

Given **the large number of stakeholders involved** in the littering problem, their different involvement levels (local, regional, national...) but also the different objectives and motivations of each of them (operational, research, innovation...), we have opted for a division into four distinct groups:

- A questionnaire **Q1** for the municipalities, the main operational entities responsible for cleanliness,
- A **Q2** for the attention of public establishments of inter-municipal cooperation (**EPCI**) with competence in waste, which are also active in the removal of litter and to which certain municipalities have been able to transfer the competence known as "cleanliness",
- A **Q3** for citizens' associations, which often have very operational initiatives related to prevention and clean-up, whatever their scale of action,
- And a **Q4** for **supra-local entities**, often with national reach and some perspective on the subject.

A specific questionnaire was developed for every type of stakeholder.

3.2 Targeted questionnaires

Given the scale of the consultation and the multitude of subjects covered, the choice was made to favour relatively long questionnaires that could address all the points essential to a detailed analysis of the problem.

Nevertheless, to facilitate the completion of the questionnaires, two methodological choices were made, notably concerning the use of:

- **Conditional questions:** by ticking a predefined answer to a formulated question, the respondent is offered a new block of precise questions that allow for a more in-depth examination of the subject. The latter are therefore only opened if the respondent mentions being concerned.
- **Non-mandatory questions:** a respondent may choose not to answer questions that they consider less essential or for which they do not know the answer.

The first three types of stakeholders (Q1, Q2 and Q3) were the subject of separate and adapted questionnaires, which nevertheless followed a relatively similar structure in order to facilitate a cross-sectional analysis of the responses to the common questions. The number of questions varies between 80 and 91, depending on the type of actor concerned.

The supra-local stakeholders were able to answer a questionnaire with a different structure and a shorter completion time, consisting of only 22 questions.

The response time is very unequal between the stakeholder groups concerned (see **Table 4**): the municipalities and supra-local entities are close to the twenty minutes or so announced at the beginning of the questionnaire, whereas the EPCIs and the associations largely exceed this estimated time. Associations were the entities that took the longest time to answer their questionnaire.

Table 4. *Number of questions and average response time for the four types of questionnaires*

Respondents targeted	Total number of questions	Average response time (min)	% of questionnaire completeness
Q1 Municipalities	80	22	62
Q2 EPCI	80	36	55
Q3 Associations	91	64	61
Q4 Supra-local entities	22	22	54

The questionnaire completion rate is based on the total number of questions and does not take into account the conditioned questions which only concern a part of the respondents each time. This explains why the observed rates do not exceed 70%. They range from 54 to 62% depending on the type of respondent.

3.3 Conducting the survey online

The four survey questionnaires were uploaded and distributed online, through the *GetFeedback* platform. They were carried out between September and November 2020 and benefited from two complementary modes of dissemination (see Table 5):

- **Dissemination of the survey's link via networks** of municipalities such as l'Association National des élus des Territoires Touristiques (ANETT), l'Association des Communes et Collectivités d'Outre-Mer (ACCDOM), l'Association des Petites Villes de France (APVF) or l'association Villes de France through its magazine Ondes Urbaines. The ID.CiTé network of legal and professional watchdogs for local authorities has also relayed the survey to the municipalities that consult it. L'Association des Maires de France (AMF) was able to review the questionnaire before it was distributed, but was unable to provide the link to its members in the time available.

- **A targeted *mailing*** to a large list of contacts, identified within a contact database set up for this purpose. This mailing complied with Regulation nº 2016/679, known as the GDPR: requests for authorisation were sent to direct email addresses prior to sending the link to the questionnaire, so as to obtain the prior consent of the targeted individuals. As regards *mailings*, a reminder was systematically sent to each type of respondent.

Municipalities located in the DROM-COM benefited from a slightly more targeted handover through the mobilisation of local Citeo representatives. The latter were able to forward the questionnaire's link to the municipalities concerned.

Table 5. Review of the survey process

Respondents targeted	Survey duration	Distribution modes	Number of completed questionnaires	Number of incomplete questionnaires
Q1 Municipalities	From[1] October 2020 to 15 November 2020	Dissemination via networks *Mailing*	**197**	279
Q2 EPCI	From September 1rst to the 30th, 2020	*Mailing*	**146**	137
Q3 Associations	From September 1rst to the 30th, 2020	*Mailing*	**29**	22
Q4 Supra-local entities	From September 1rst to the 30th, 2020	*Mailing*	**34**	52

In total, **more than 400 respondents answered the questionnaire in full.** Many people also opened the link to their respective questionnaires, but did not validate their answers, so the questionnaires were considered incomplete. Several factors may explain this:

- The lack of time of our interlocutors in a time-consuming and difficult to manage health crisis,
- The fact that the *Getfeedback* platform does not allow responses to be recorded meant that the form had to be filled out in one go, even though obtaining some of the data might require the involvement of other interviewers,
- The fact that the person who received the questionnaire does not have all the necessary information to fill it in on their own or is not the right person to contact (some emails are generic and therefore do not target the most relevant person on the subject),
- The length of the questionnaire, which could be assessed from the progress bar,
- The fact that some entities did not feel more concerned by the issue (such as some EPCIs or some public bodies that expressed this in their comments),
- Formulations related to anonymity that may have raised concerns about being judged *after the fact*. In this respect, 58% of respondents wished to keep their identities and answers anonymous (see Figure 8).

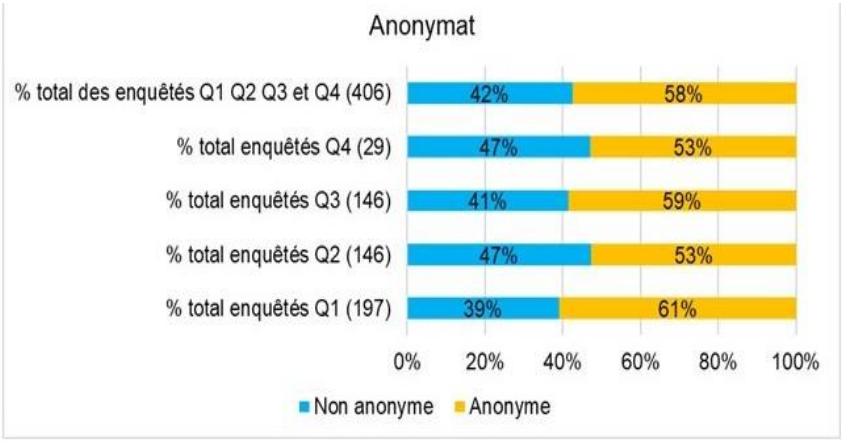

Figure 8. Percentage of respondents who wished to remain anonymous.

40% of respondents overall would be interested in continuing to share their experience regarding littering, including 36% who provided their email address for further discussion. More specifically, it involves:

- 26% of municipal representatives (an additional 4% indicated interest but did not provide contact details);
- 45% of the EPCI representatives, including 2 entities that did not provide their e-mail address;
- 72% of associations;
- 62% of the other supra-local entities, of which 3 did not indicate an email to contact them.

Finally, the respondents did not question the fact that Citeo is the bearer of this consultation and is taking a position on this subject, which is new for the company.

4. Methodology for organising the debate sessions

The debate sessions were conducted through two distinct tracks:

- The aim of this **institutional course** was to bring together expert stakeholders with a cross-sectional view of the issue. The institutional course was therefore structured around three two-hour meetings on each of the themes studied, namely: characterisation, preventive methods, curative methods;
- **An operational track** that aimed to bring in more technical stakeholders with targeted expertise on one of the topics. For each topic, the sessions were held in two parts of 2.5 hours each: an opening time and a time for more in-depth reflection.

A wide range of stakeholders participated in these debates in order to ensure a variety of views and to ensure that the different spaces (natural, urban, etc.) were well represented.

The Chatham House Rules have been adopted. They stipulate that participants do not divulge each other's opinions so that they can express themselves freely on the various topics discussed.

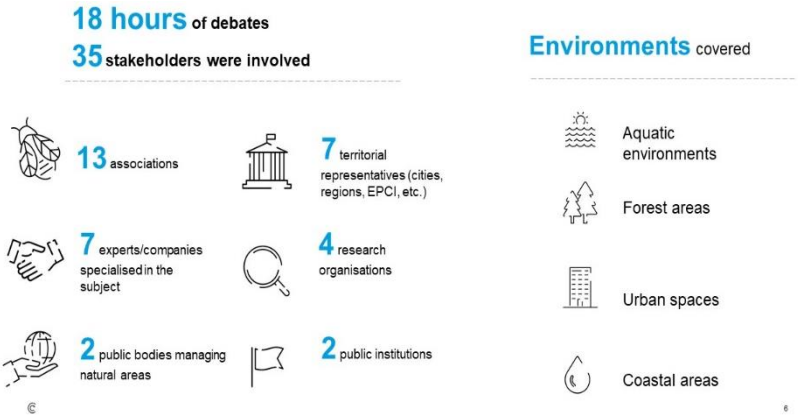

Figure 9. Review of the debate sessions and the diversity of stakeholders included

The study's steering committee members had the opportunity to attend the debate sessions, on the one hand to provide their expertise in relation to their work, but also to take part in the exchanges and thus enrich the discussions. Nine debate sessions were held in November 2020.

Table 6. Review of the debate sessions

Course	Format	Date	Number of participants
Pathway 1 - institutional pathway	3 meetings, one on each theme	November 2nd November 12th November 19th	16 invited participants
Workshop 1 - operational pathway Characterisation	1 opening meeting and 1 in-depth meeting	November 3rd November 5th	12 invited participants
Workshop 2 - operational pathway Prevention	1 opening meeting and 1 in-depth meeting	November 12th November 16th	10 invited participants
Workshop 3 - operational pathway Management (collection, cleaning, recovery...)	1 opening meeting and 1 in-depth meeting	November 19th November 23rd	9 invited participants

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