



The impact of the COVID-19 pandemic on municipal waste management systems

Results and analysis of a survey
carried out by ACR+ between
July and October 2020

Acknowledgements:

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EXECUTIVE SUMMARY

The COVID-19 pandemic

The Coronavirus (COVID-19) is an infectious disease caused by a newly discovered coronavirus. In December 2019, an outbreak is registered in the Chinese municipality of Wuhan, and reached Europe in early 2020. In reaction to the situation, most European countries took various restrictive measures at national level to limit the spreading of the virus, which impacted both waste generation and the organisation of waste services. Although, the COVID-19 pandemic continues to hit Europe to this date, this report focuses on the first “wave” that goes from February to June 2020. The presented information mostly focuses on this period, unless specified otherwise.

Observed trends during the first lockdowns

The pandemic and associated restrictive measures entailed different trends regarding municipal waste management. Local authorities had to adapt their services to ensure the safety of their staff, and deal with shortage of staff. The main trends are summarised on the following scheme:

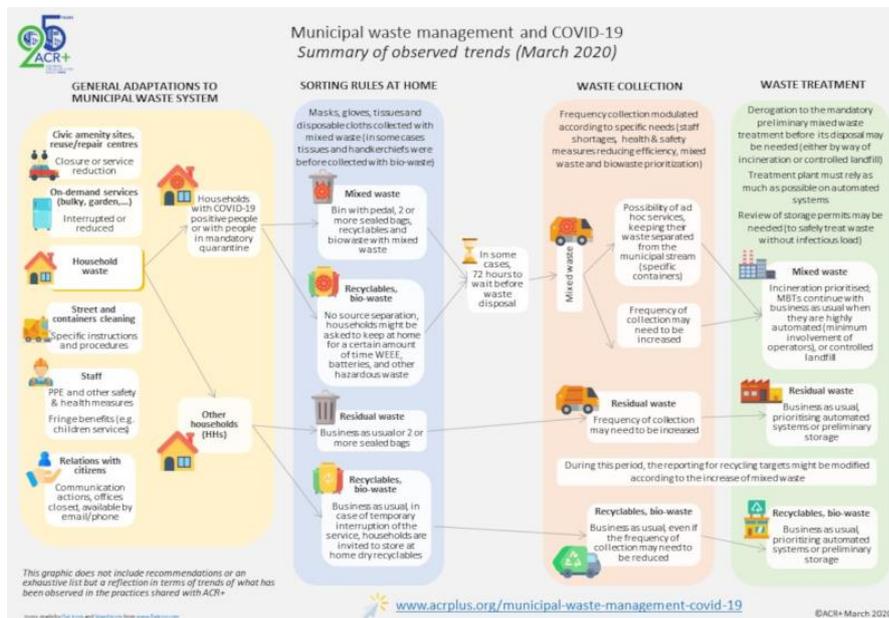


Figure 1: Municipal waste management and COVID-19, summary of trends (March 2020)

The survey on the impact on COVID-19

In July 2020, ACR+ launched an online survey in the framework of the COLLECTORS project to better understand the measures taken at local level and the evolution of generated and sorted quantities of municipal waste during the “first wave” of the pandemic. 16 respondents from 10 different countries provided detailed answers; the panel encompasses very different territories in terms of typology, size, or tourism intensity.

Measures implemented at local level

Collection services were quite impacted by the pandemic and lockdowns: while the collection of “common waste” through door-to-door or bring system remained unchanged for most of the respondents, many reported reduction or interruption of on-demand collection or closure of civic amenity sites. This partly led to an increase of fly-tipping. Sorting and treatment systems experienced minor disruptions among the panel. The respondents also reported quite different responses regarding the collection of households with COVID-19 cases: some set specific round of collection, while most respondents mainly asked households to take precautions for potentially contaminated waste.

Impact on municipal waste generation and separation

The impact of the pandemic on municipal waste generation differs from one respondent to another, yet the most common trend is a general decrease of generated quantities, attributed to the decrease of commercial waste that was not compensated by an increase of household waste. Some respondents also presented significant decreases that can be attributed to the sharp reduction of tourism.

However, waste sorting performances were not affected by the pandemic, most respondents that reported stabilising or even increasing performances. Reductions were observed in territories where the selective collections could not be maintained (e.g. where collection frequencies of food waste or paper and packaging waste were decreased).

These findings were corroborated with information gathered from other studies and reports.

Main conclusions

The analysis of the survey’s responses and of the different guidelines and reports identified allowed listing several key recommendations that were already presented in the COLLECTORS [Guidelines for implementation](#):

- **Flexibility** is key to ensure the continuation of priority collection services, and the territories that could maintain good collection were the ones that could re-allocate resources among the different collection schemes;
- **Keeping civic amenity sites open** with adequate measure can be recommended, possibly with online booking.
- **Define priority levels** for collection services, focusing on collection modes limiting the interactions with inhabitants, or on specific waste fractions. Keeping selective collection services running proves to be essential to maintain sorting performances.
- **Give priority to online communication** to reach inhabitants, provide clear information and simple, coordinated messages, and explaining the reasons behind changes.
- **Establish a consistent and continuous reporting** of the evolution of quantities.
- **Tackle illegal practices** such as fly-tipping by setting a closer monitoring, the enforcement of the regulation, an adequate communication.
- **Take advantage of guidance**, support systems and networks, to identify good practices and recommendations.
- **Follow UNEP recommendations** regarding the management of waste from COVID-positive households.

INTRODUCTION

1 The COVID-19 pandemic in Europe

The Coronavirus (COVID-19) is an infectious disease caused by a newly discovered coronavirus. In December 2019, an outbreak is registered in the Chinese municipality of Wuhan, quickly spreading to the whole China and other countries. The first cases appear in Europe in early 2020, with a significant increase of cases striking Northern Italy in February 2020. By mid-March 2020, Europe is the centre of the epidemic and all countries on the continent are affected.

In reaction to the situation, most European countries took various restrictive measures at national level to limit the spreading of the virus. The timeline and exact natures of restrictions differ from one country to another, sometimes even applied differently at subnational level. Most countries closed schools, non-essential retails and services (including HORECA sector), and many declared “state of emergencies” enforcing various constraining measures on travels, public events, and closure of businesses. Some countries implemented even stricter “lockdown” measures restricting the movement of population for non-essential purpose (e.g., Italy, France, Spain). In other countries such as Sweden, government took very few measures and mostly relied on social distancing and ban of public events. In general, lockdown measures were introduced in March 2020, and restrictions were progressively lifted between April and June. An overview of the key measures taken by different European countries during this period and in relation with municipal waste management is available in the annexe.

Although, the COVID-19 pandemic continues to hit Europe to this date, this report focuses on the first “wave” that goes from February to June 2020. The presented information mostly focuses on this period, unless specified otherwise.

1 The pandemic and its challenges for local authorities

The pandemic proved very challenging for local authorities to keep the municipal waste services available to the inhabitants. At first, while the pandemic was progressing and lockdowns imposed in many countries, public authorities and municipal waste operators had to rapidly adapt their waste management systems and procedures to the situation. For many local waste authorities, the key priority was to ensure the safety of collection staff, especially when collecting waste that could be potentially infected.

The different lockdown mentioned above impacted waste generation, composition and management; knowing that the measures taken in the different regions and their length are likely to create different impact. For example, the closure of businesses and HORECA is likely to reduce the generation of commercial waste, while the restrictions of movement are likely to increase the waste generated by households. Besides, it could lead to changes in the number and composition of private waste producers, including both the resident population with people deciding to go to their secondary home and the tourists that would have normally been here. For instance, it is assessed that the Paris Region

lost about 20% of the population (including the tourists), with about 11% of the inhabitants of the Paris Region staying outside of their primary residence (e.g., students going back to their parents' place), of which 5% is outside the region¹.

In terms of collection and sorting services, local authorities faced several challenges such as:

- Continuing collection service in safe condition for collection operators;
- Managing staff shortages;
- Providing citizens and businesses with effective messages on how to handle safely municipal waste during the pandemic and at the same time keeping sorting habits as much as possible;
- Addressing rebound effect (fly tipping, littering, complaints about the closure of civic amenity sites).

It has to be noted that the crisis moved along the value chain, following the evolution of the pandemic. If at first, collection systems were mainly impacted, the crisis progressively reached other players such as recyclers.

1 ACR+ work

ACR+ monitored and analysed how the measures taken in the wake of the COVID-19 outbreak impacted waste collection services, waste generation, and sorting performance. In March 2020, replying to requests from its members, ACR+ started collecting data on the changes brought to municipal waste management in various parts of Europe, both regarding the changes in regulation and guidelines proposed by national and regional authorities, and the local practices implemented by waste authorities and companies.

To complement this work and in the framework of the [H2020 COLLECTORS project](#)², ACR+ ran an online survey targeting municipal and local authorities (or their waste operators) to understand and assess the impact of the COVID-19 on their waste systems and gather quantitative data on the evolution of collected quantities. The aim was to identify interesting practices and analyse the key factors to increase the capacity of waste management systems to respond to health crises while keeping prevention and recycling high on the agenda. This document presents the results of this survey, conducted between July and October 2020. It is illustrated by interesting measures and practices implemented by a selection of public authorities across Europe, spotted by ACR+ during its work, to ensure the continuity of municipal waste services. The illustrations are not necessarily practices identified from the respondents of the survey.

Additional findings from the survey are presented in two COLLECTORS deliverables, namely the COLLECTORS [Guidelines for implementation](#) and [Policy recommendations](#).

¹ Institut Paris Region, *Note rapide n°867*, available here:

https://www.institutparisregion.fr/fileadmin/NewEtudes/000pack2/Etude_2434/NR_867_web.pdf

² The COLLECTORS project (www.collectors2020.eu/) aims to identify and highlight existing good practices of waste collection and sorting in relation to three waste streams: paper and packaging waste, waste electrical and electronic equipment, and construction and demolition waste.

OBSERVED TRENDS DURING THE FIRST LOCKDOWNS

OBSERVED TRENDS DURING THE FIRST LOCKDOWNS

The collection and analysis of the local practices and changes brought to the local waste service allowed ACR+ to identify key trends on how the COVID-19 pandemic and the restrictive measures impacted municipal waste management during the first lockdowns, that is until April 2020. These trends are summarised on the following figure:

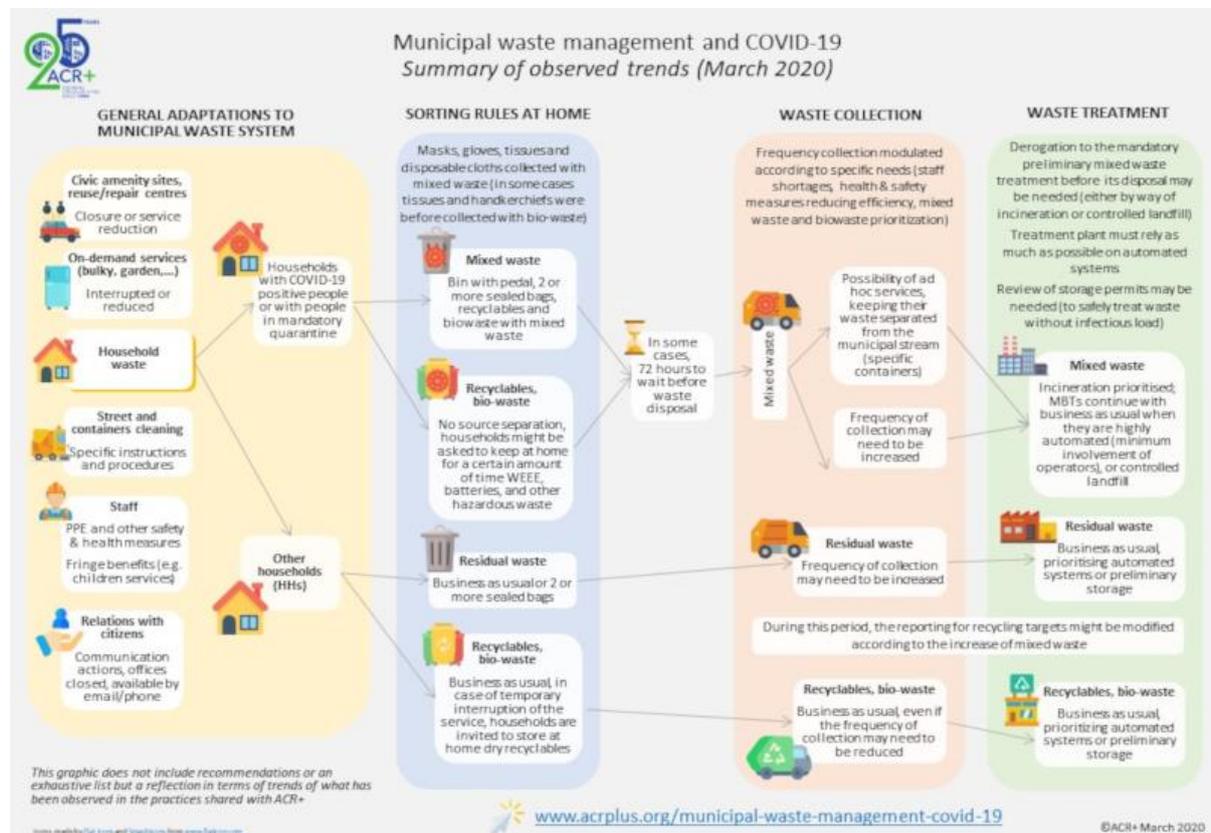


Figure 2: Municipal waste management and COVID-19, summary of trends (March 2020)

The main measured implemented are presented in the following table:

Topic	Main measures implemented
Ensuring the safety of the staff	<ul style="list-style-type: none"> ▪ Interruption of services with contacts with citizens or limiting these contacts by ensuring social distancing. This was also achieved by limiting the number of simultaneous users on civic amenity sites e.g., by introducing a mandatory booking, or by not accepting users when maximum capacity is reached. ▪ Giving priority to collection services that limit interactions with users, such as door-to-door or bring systems;

OBSERVED TRENDS DURING THE FIRST LOCKDOWNS

	<ul style="list-style-type: none"> ▪ Provide suitable protection equipment (PPE, such as gloves, masks, hydroalcoholic gel for hands and to disinfect equipment, e.g. truck cabins, etc.). ▪ Train collection staff about safety measures and use of PPE. ▪ Rearrange shift duration, to limit interactions among workers and to guarantee the implementation of additional health and safety measures ▪ Adapting collection teams and collection routes to avoid contacts in common areas. ▪ In sorting and treatment units, ban any manual manipulation and pretreatment process before disposal, or introduce a mandatory temporary storage.
<p>Maintaining collection services</p>	<p>Higher waste generation, specific requirements for the collection of potentially infected waste, or shortage of staff, lead to the need of prioritising waste collection services. The following level of priority was identified:</p> <ul style="list-style-type: none"> ▪ High priority: residual waste, food waste, medical waste or residual waste from contaminated households, fly-tipping. ▪ Medium priority: dry recyclable waste, civic amenity sites. ▪ Low priority: bulky waste, garden waste. <p>Maintaining the operation of civic amenity sites might be useful to limit fly-tipping. More measures focusing on CAS are presented below.</p>
<p>Operating civic amenity sites</p>	<ul style="list-style-type: none"> ▪ Ensuring social distancing is to keep the staff and users safe, by adapting the circulation of users and limiting their number on sites: wider walk ways, one-way routes, etc. ▪ Limiting the access to reduce frequentation and maintain an acceptable level of service. This can be done by giving priority to key waste fractions (for instance construction and demolition waste, garden waste, etc.) or by allowing only specific users (commercial activities, or only private vehicles), depending on the specific local needs. ▪ Online booking: it can also require the user to list the type of waste that is going to be brought, which can help to enforce limitations on the access of the service. ▪ No manual handling of the waste by the staff ▪ Storage time before handling: waste has to be stored 72 hours before being collected and sent to treatment. ▪ Communication on changes on website and social media Signs can also be displayed at the entrance of the CAS to remind the safety measures, or warn users of new specific conditions
<p>Collecting households with COVID cases</p>	<p>For inhabitants:</p> <ul style="list-style-type: none"> ▪ Separate infectious waste, including masks, gloves, and tissues; ▪ Use double bagging for this potentially infectious waste, and disinfect the bag; ▪ Keep recyclable waste for a certain period of time (until patients are cured) before putting it for collection;



OBSERVED TRENDS DURING THE FIRST LOCKDOWNS

	<ul style="list-style-type: none">▪ Stop using collection points. <p>For collection and transportation:</p> <ul style="list-style-type: none">▪ Arrange special collection service;▪ Consider inter-city cooperation for such service;▪ Ban opening of bags or pre-treatment at transfer/treatment units, and try to transport directly to the final treatment process;▪ Disinfect the collection vehicles.
Communication	<ul style="list-style-type: none">▪ Rely on online communication (website, social media), as well as to hotlines to address increasing solicitations from the population;▪ Send letters to inhabitants and building managers to inform on key changes;▪ Explain the reasons behind these changes, especially in case of interruption of selective collection or changes brought to the sorting guidelines;▪ Stay consistent with national messages and guidelines.
Fighting littering	<ul style="list-style-type: none">▪ Communication campaign on the negative impact of littering;▪ Increasing fines on littering.

A summary of the measures and practices identified by ACR+ is presented in the Annexe.

SURVEY ON THE IMPACT OF THE COVID-19 PANDEMIC

As mentioned previously, a survey was proposed by ACR+ within the framework of the COLLECTORS project.

3 1 Overview of the survey

The survey was launched online in July 2020, with several objectives:

- Identify local responses to the COVID 19;
- Assess the impact of the first wave (February to June 2020) on municipal waste quantities and sorting performances, by comparing monthly data from 2020 with data from 2019;
- Identify the impact on the various waste management elements: collection points and services, treatment units, etc.

The survey focused on key waste fractions to make data collection easier for respondents: residual waste, food waste, and dry recyclables (i.e., paper and packaging waste).

3 2 Respondents

16 national or local authorities in charge of waste management, located in 10 different countries, filled in the COLLECTORS online survey. They represent about 19,400,000 inhabitants and cover very different types of territories, from large cities to more rural areas, as well as touristic cities.

SURVEY ON THE IMPACT OF THE COVID-19 PANDEMIC

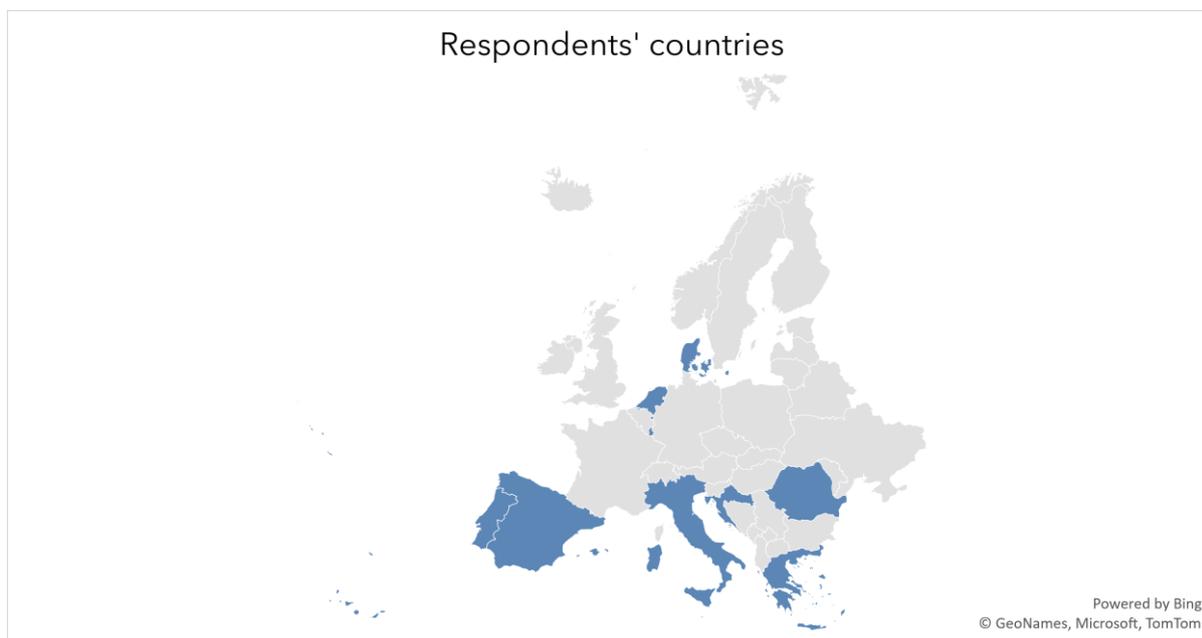


Figure 3: map of the countries covered by the survey

All the respondents are in charge of organising municipal waste management, either at municipal, intermunicipal or national level (the latter applies for respondents representing small countries).

Table 1: List of respondents

Country	No. of respondents	Sum of Population
Group of municipalities	6	16,757,619
Italy	2	849,200
Portugal	2	1,103,133
Romania	1	14,488,488
Spain	1	316,798
Municipality	8	1,480,845
Croatia	1	806,341
Denmark	1	205,000
Greece	1	55,525
Netherlands	1	25,068
Portugal	2	332,865
Spain	2	56,046
National Authority	2	1,140,672
Luxembourg	1	626,108
Malta	1	514,564
Grand Total	16	19,379,136

3 Territorial typology of respondents

The table below lists the respondents highlighting the typology of the territories they cover. This is a rather qualitative classification to help reflect on the impact of the pandemic in different contexts.

Table 2: typology of the respondents

Respondent Code	Territorial category	Country	Population	Territorial profile
R1	Municipality	Portugal	212,474	Touristic
R2	Municipality	Netherlands	25,068	Urban
R3	Municipality	Denmark	205,000	Urban
R4	National Authority	Luxembourg	626,108	Urban
R5	Municipality	Croatia	806,341	Urban
R6	Group of municipalities	Spain	316,798	Urban and rural
R7	Group of municipalities	Portugal	143,564	Urban, rural
R8	Municipality	Spain	37,456	Urban, touristic
R9	Municipality	Spain	18,590	Urban, touristic, rural
R10	Municipality	Portugal	120,391	Touristic
R11	National Authority	Malta	514,564	Touristic, Island
R12	Group of municipalities	Portugal	959,569	Urban, rural
R13	Group of municipalities*	Romania	14,488,488	Urban, rural
R14	Municipality	Greece	55,525	Urban, touristic
R15	Group of municipalities	Italy	535,000	Urban, rural
R16	Group of municipalities	Italy	314,200	Urban, rural

* R13 consists in aggregated data from different Romanian municipalities covering about 75% of the national territory.

3 4 Municipal waste collection systems

The survey gathered data about the collection systems operated for three municipal waste streams:

- Residual waste (RW);
- paper and packaging waste (PPW);
- organic municipal waste, e.g., food and kitchen waste (FW).

The municipal waste streams generally include households waste and commercial waste (normally small businesses and the HORECA sector). Some of the respondents provided data about the share of commercial waste in the municipal waste stream, which ranges from a few percent, to almost 50% of the collected waste, as presented on the following graph:

SURVEY ON THE IMPACT OF THE COVID-19 PANDEMIC

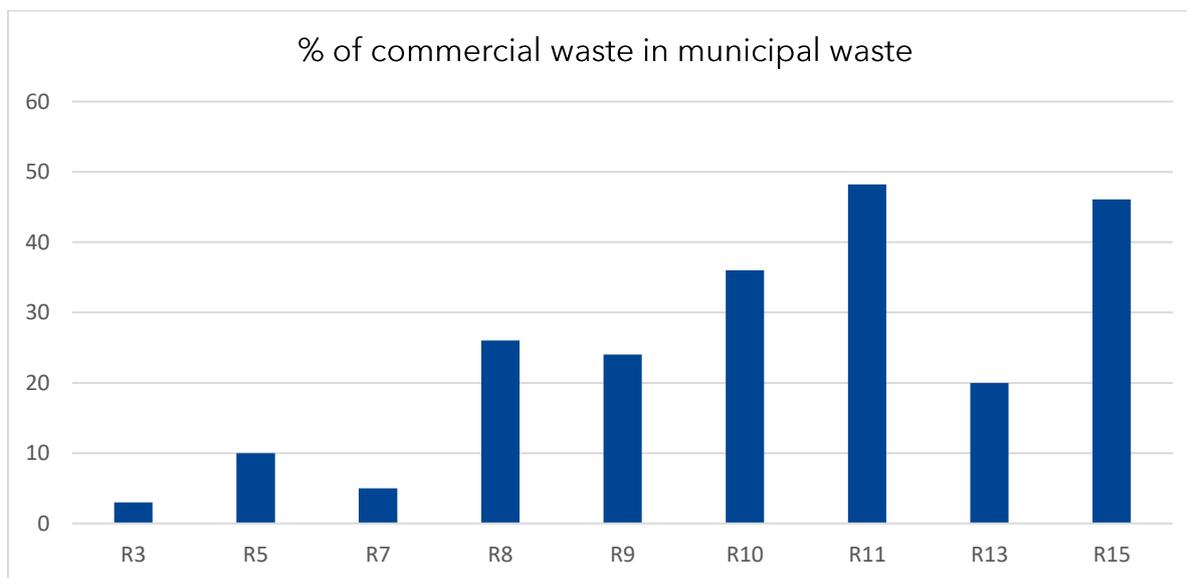


Figure 4: share of commercial waste in municipal waste

The panel of respondents encompasses various collection modes, as presented in the following graph:

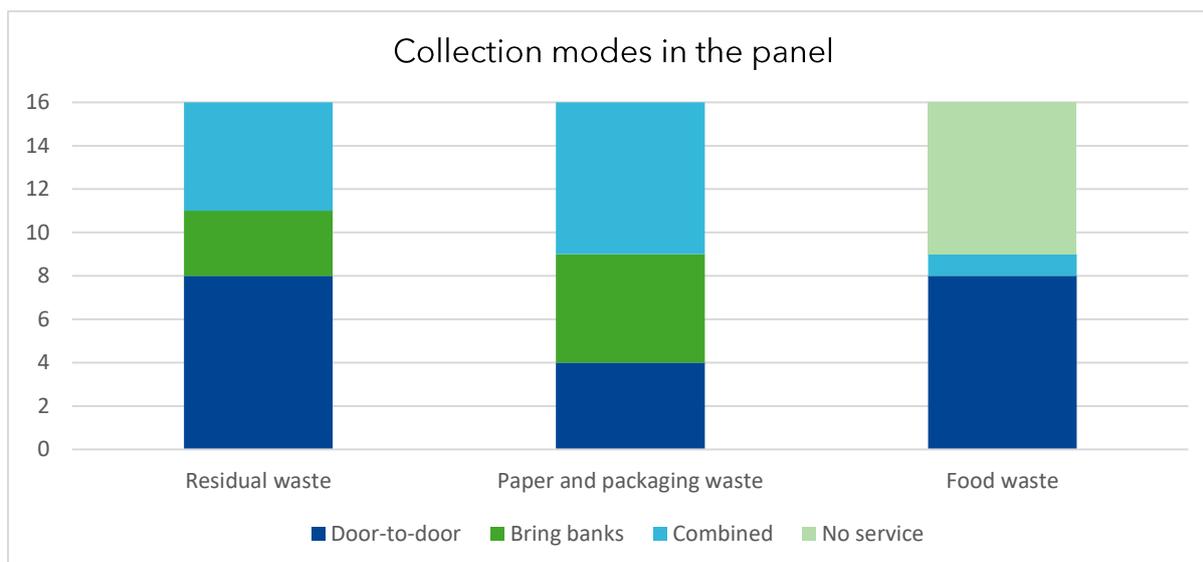


Figure 5: use of collection modes for the different waste streams

The panel is quite diverse when it comes to collection modes, with door-to-door being the main collection mode used for residual waste and food waste. About half of the respondents do not have a food waste collection service. The collection modes used by the different territories are presented in the following table, along with the systems using Pay-As-You-Throw (PAYT), and territories with deposit-refund systems are available:

SURVEY ON THE IMPACT OF THE COVID-19 PANDEMIC

Table 3: collection modes, PAYT, and DRS in the different respondents' territories

	Residual waste	Paper and packaging waste	Food waste	PAYT	DRS
R1	Combined	Combined	Combined	✗	✗
R2	Combined	Door-to-door	Combined	✗	✗
R3	Door-to-door	Door-to-door	Door-to-door	✗	✓ Glass, plastic, and metal beverage containers
R4	Door-to-door	Door-to-door	Door-to-door	✓	✗
R5	Door-to-door	Door-to-door	Combined	✗	✓ Glass, plastic, and metal beverage containers
R6	Bring bank	Service not provided	Bring bank	✗	✗
R7	Door-to-door	Service not provided	Bring bank	✗	✗
R8	Bring bank	Service not provided	Bring bank	✗	✗
R9	Combined	Service not provided	Bring bank	✗	✗
R10	Bring bank	Service not provided	Bring bank	✗	✗
R11	Door-to-door	Door-to-door	Combined	✗	✗
R12	Combined	Door-to-door	Combined	✗	✗
R13	Door-to-door	Service not provided	Combined	✓	✗
R14	Combined	Service not provided	Combined	✗	✗
R15	Door-to-door	Door-to-door	Door-to-door	✓	✗
R16	Door-to-door	Door-to-door	Door-to-door	✗	✗

PAYT systems all consist in variable charges applied to residual waste. The deposit-refund systems operated in R3 and R5 (in Denmark and Croatia) both focus on beverage packaging (glass, plastic and metal containers).

3.5 Measures implemented to mitigate the impact of the COVID-19 pandemic on waste systems

3.5.1 Lockdown period and measures

During the so-called first wave of the COVID-19 pandemic (first semester 2020), a set of restrictions, normally referred to “lockdowns”, were introduced in all of the respondents’ territories, except in one case (municipality in the Netherlands). The starting dates of the lockdown range between 10 and 22 March 2020, lasting for a variable period from 13 days to 97 days and on average 66 days.

In this report, the restrictive measures are referred as “lockdowns”. However, it must be noted that this term encompasses very different situations with various restrictions enforced, with variations over time as national authorities enforced gradual measures and lifted them progressively. In general, citizens’ movement was restricted (with people forced to stay home in the stricter versions of the lockdown), limits were imposed on social gathering and meetings, schools were closed, non-essential services (HORECA sector in particular) were suspended, and teleworking was promoted.

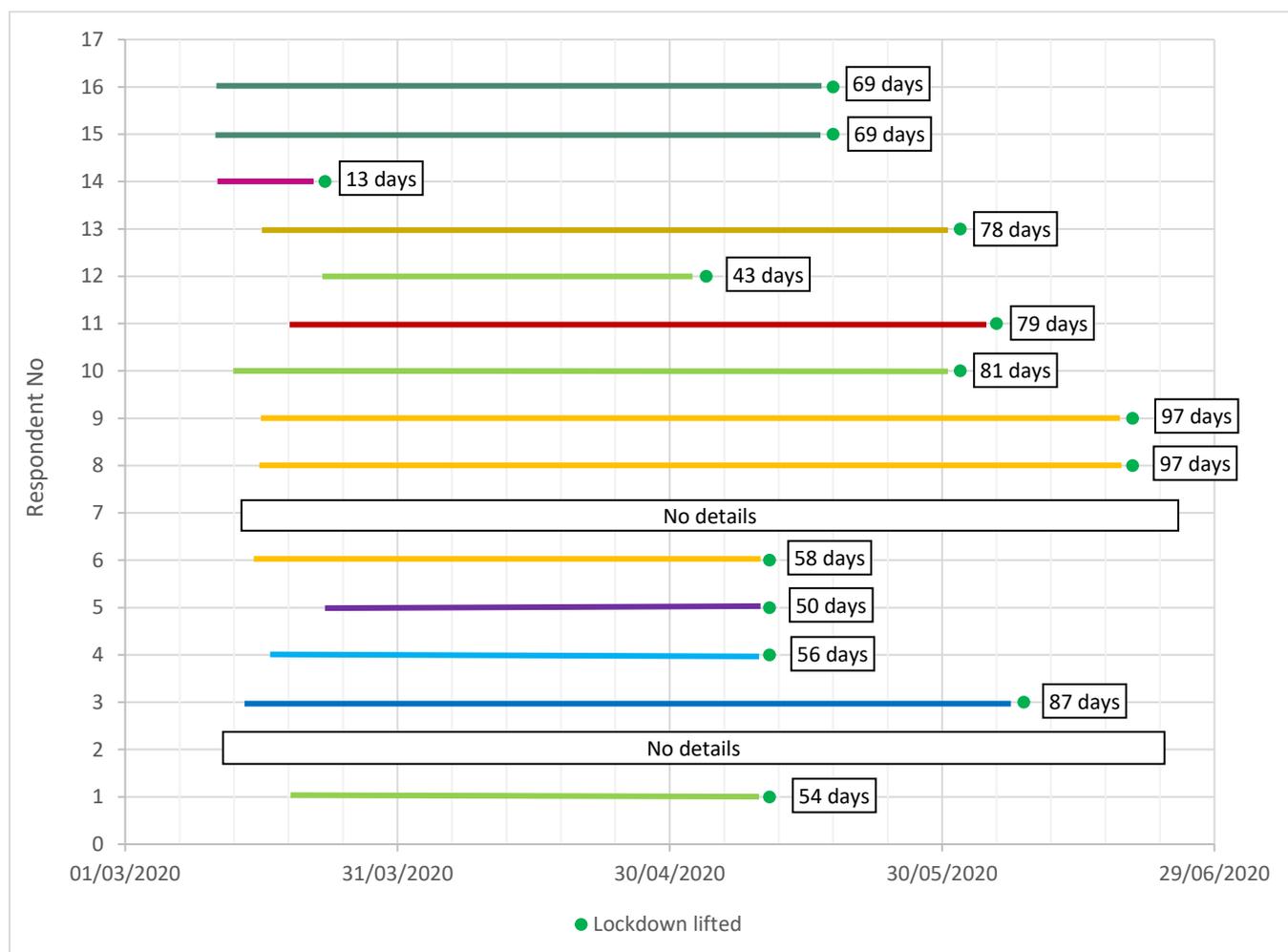


Figure 6: lockdown periods in the different respondents' territories

3.5.2 Municipal waste collection service and frequency

During the lockdown period, the respondents kept on operating the collection services for the residual, paper and packaging, and, when the source separated collection is offered, food waste streams. The vast majority of the respondents ran the services with the same frequency as usual, whereas 3 out of the 16 modified the frequency, as explained below. These changes might have different causes: shortage of staff, increased production by households, etc.

Table 4: changes brought to collection frequencies reported by 3 respondents

	R12		R13		R14	
	Usual frequency	Adapted frequency	Usual frequency	Adapted frequency	Usual frequency	Adapted frequency
Residual waste	Daily		Twice a week	Every other day	Daily	Every other day
Food waste	Every other day	Bi-weekly	No service		No service	
Paper and packaging waste	Weekly		Weekly		Daily	Every other day

A group of municipalities from Portugal (R12) reduced the (door-to-door) collection frequency for the organic municipal waste from *every other day* to *twice a week*, while the collection frequency for the residual waste (*daily* with a door-to-door system) and the paper and packaging municipal waste (*weekly* with a door-to-door and bring bank system) remained unchanged over the lockdown period.

A group of municipalities from Romania (R13) increased the door-to-door collection intensity for the mixed municipal waste from *twice a week* to *every other day*, while the paper and packaging municipal waste service kept on running on a business-as-usual scenario (*weekly* with a door-to-door collection system).

A municipality of the panel from Greece (R14) reduced the intensity of the services provided (door-to-door and bring bank system) during the lockdown, which was halved (from *daily* to *every other day*) for both the mixed and paper and packaging municipal waste. In this municipality there is no source separate collection for the organic waste.

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A waste platform to support struggling councils (UK)

In April 2020, Zero Waste Scotland launched an online platform to connect local authorities requiring support in maintaining their waste services and private operators with capacity to help.

Available online at <https://scotlandwastecapacityplatform.org/> , the Scotland Waste Capacity Platform allows local authorities who may be temporarily short of resource, such as staff for waste collection vehicles or vehicles themselves, to match with organisations that could help fill the gaps. On the other hand, private operators can list what they can offer for local authority use.

Source: [Zero Waste Scotland](#)

Reallocating staff to maintain priority services (AT)

In Vienna, the main focus during the crisis, in April 2020 was to keep the waste collection services for residual waste as well as recyclables running. For this, the Municipality could count on a large pool of manpower available and carried out some staff reallocation when necessary. The employees in charge of street sweeping have been reduced by over 50% so they were able to help out in more urgent and essential fields of work like waste collection services. All services have been reduced to a minimum. In addition, a pool of operative employees is staying at home in order to replace other employees in the field of collection services if necessary.

Source: [communication](#) from Vienna Waste Management Services to ACR+

3.5.3 Civic amenity sites and reuse centres

During the lockdown periods, most of the respondents reported disruptions in the civic amenity site services, due to different factors such as restrictions preventing people from using them, shortage of staff making the operation impossible, etc.

The following graph takes into consideration only the respondents who provided an answer to this specific question.

SURVEY ON THE IMPACT OF THE COVID-19 PANDEMIC

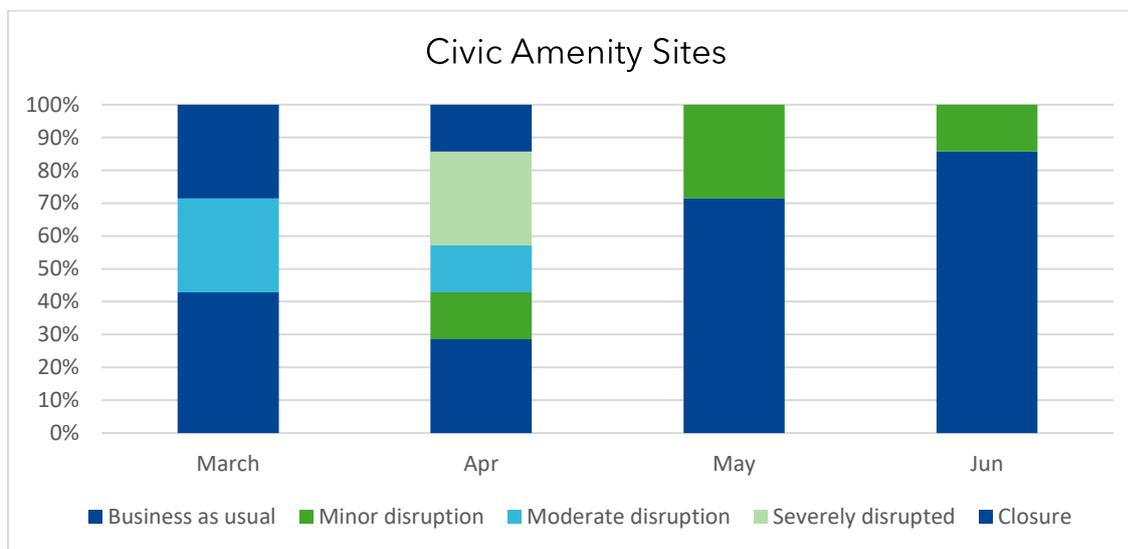


Figure 7: evolution of the service provided by civic amenity sites among the documented panel

Most closures and severe disruptions occurred at the earliest stages of the pandemic, in March and April. In May and June, only minor disruptions were reported by some respondents. Only one respondent provided data about the reuse centre services, which were interrupted during the lockdown.

3.5.4 On-demand services

During the lockdown period most of the respondents reported disruptions for the on-demand collection services, which are mainly organised for the collection of bulky and garden waste. 20% of the respondents who provided an answer to this question reported services interruptions already happening in March. This condition was extended to 60% in April, while the services were progressively reactivated in May and most significantly in June (as shown in the following graph).

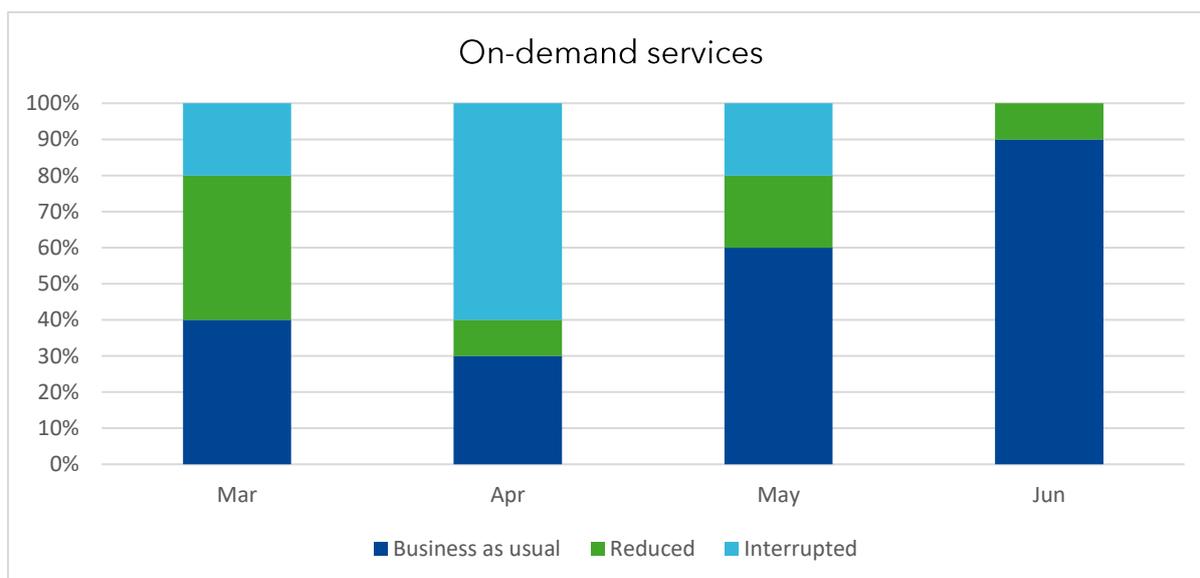


Figure 8: evolution of the on-demand services provided by the respondents

SURVEY ON THE IMPACT OF THE COVID-19 PANDEMIC

3.5.5 Fly-tipping

Some respondents reported increasing fly-tipping phenomena during the lockdown, as shown in the graph below (taking into consideration only the respondents who provided an answer to this specific question).

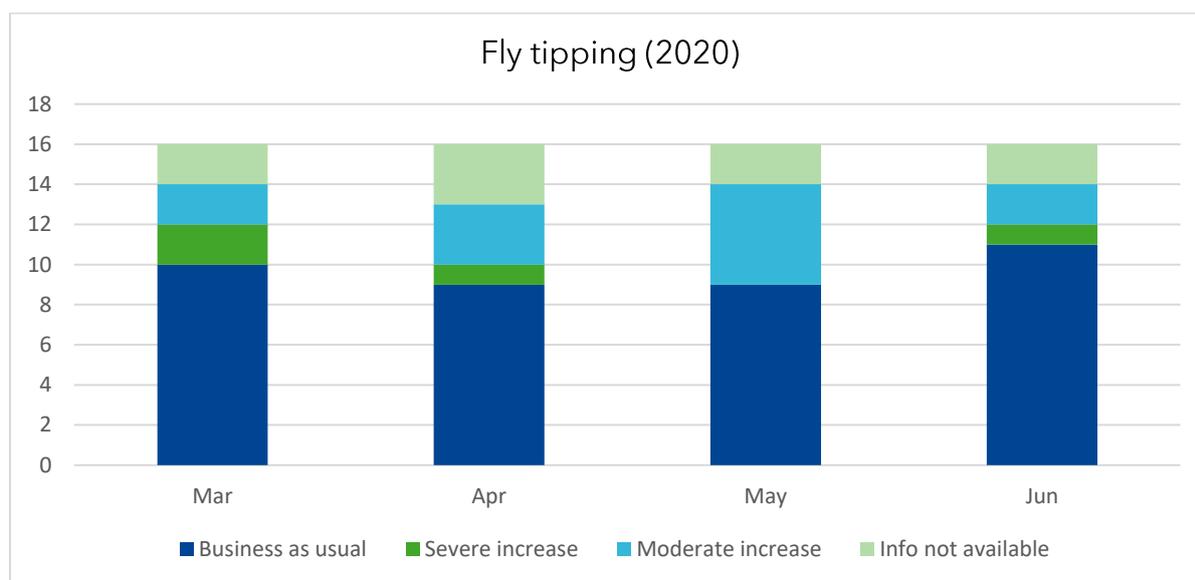


Figure 9: evolution of fly-tipping in the different respondents' territories in 2020

When comparing the disruption of civic amenity sites and on-demand services with the evolution of fly-tipping, no clear correlations can be identified. The following table summarises the main disruptions, the number of months during which disruption occurred, and the evolution of fly-tipping:

Table 5: disruption of CAS and on-demand collection services and evolution of fly-tipping

	Civic amenity sites	Months with disruption	On-demand	Months with disruption	Fly tipping
R1	None		Interrupted	3	increase
R2	None		None		Business as usual
R3	Closure	2	Interrupted	2	increase
R4	Closure	3	Interrupted	3	Business as usual
R5	None		Business as usual		increase
R7	Business as usual		None		Business as usual
R8	No information		No information		increase
R9	Severe disruption	4	Interrupted	1	increase
R10	None		Business as usual		increase
R11	Business as usual		Business as usual		increase
R12	Moderate disruption	1	Interrupted	3	Business as usual
R13	None		No information		Business as usual
R14	None		Interrupted	4	Business as usual
R15	Severe disruption	2	Reduced	2	Business as usual

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While in some territories, the increase of fly-tipping can be linked with the interruption of one or both services, other territories experienced serious disruptions with visibly little impact on fly-tipping. On the contrary, fly-tipping increased in other territories where the services were kept running. If the interruption of collection services has played a role in the increase of fly-tipping, other factors are likely to have an influence. This can also be seen in the following table showing the evolution of fly-tipping and of bulky waste collection services during the different months.

Table 6: evolution of fly-tipping, civic amenity sites, and on-demand services between March and June 2020

	Status	March	April	May	June
R1	Fly tipping	Severe increase	Severe increase	Moderate increase	-
	CAS	None	None	None	None
	On-demand service	Reduced	Interrupted	Reduced	-
R3	Fly tipping	Moderate increase	-	-	-
	CAS	Closure	Minor disruption	-	-
	On-demand service	Interrupted	Interrupted	-	-
R4	Fly tipping	-	Moderate increase	Moderate increase	-
	CAS	Closure	Closure	Minor disruption	-
	On-demand service	Interrupted	Interrupted	Interrupted	-
R9	Fly tipping	-	-	Moderate increase	Moderate increase
	CAS	Moderate disruption	Severe disruption	Minor disruption	Minor disruption
	On-demand service	-	Interrupted	-	-

Funding ringfenced to tackle illegal dumping during COVID-19 (IE)

In April 2020, the Irish Minister for Communications, Climate Action and Environment announced that EUR1 million of funds from the Anti-Dumping Initiative will be ringfenced to support efforts to tackle a reported increase in illegal dumping during the COVID-19 crisis. Among the activities supported: waste removal and the installation of CCTV or other monitoring and surveillance equipment.

According to [official data](#), there has been an 11% increase in the number of calls reporting illegal dumping during the COVID-19 pandemic.

Source: [Irish Ministry for Communications, Climate Action and Environment](#)

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Socially distant but always on duty - using technology to catch waste criminals during COVID-19 pandemic (UK)

To tackle unscrupulous waste operators seeing to take advantage of the COVID-19 crisis while complying with social distancing guidelines, Natural Resources Wales (NRW) used high-tech surveillance techniques. NRW officers, unable to use their usual investigation methods, turned to sophisticated drone technology and satellite cameras to help in the tracking of waste criminals and ensure that waste operators comply with environmental regulations. For example, imagery obtained by drones can be used to identify the extend of illegal tipping on land which would normally take two NRW waste officers to physically investigate.

Source: [Natural Resources Wales](#)

3.5.6 Street cleaning

If most of the respondents have reported that the street cleaning services kept on operating with business-as-usual standards during the lockdown, in some cases the operational activities were either increased or decreased (especially in March and April). The following graph takes into consideration only the respondents who provided an answer to this specific question.

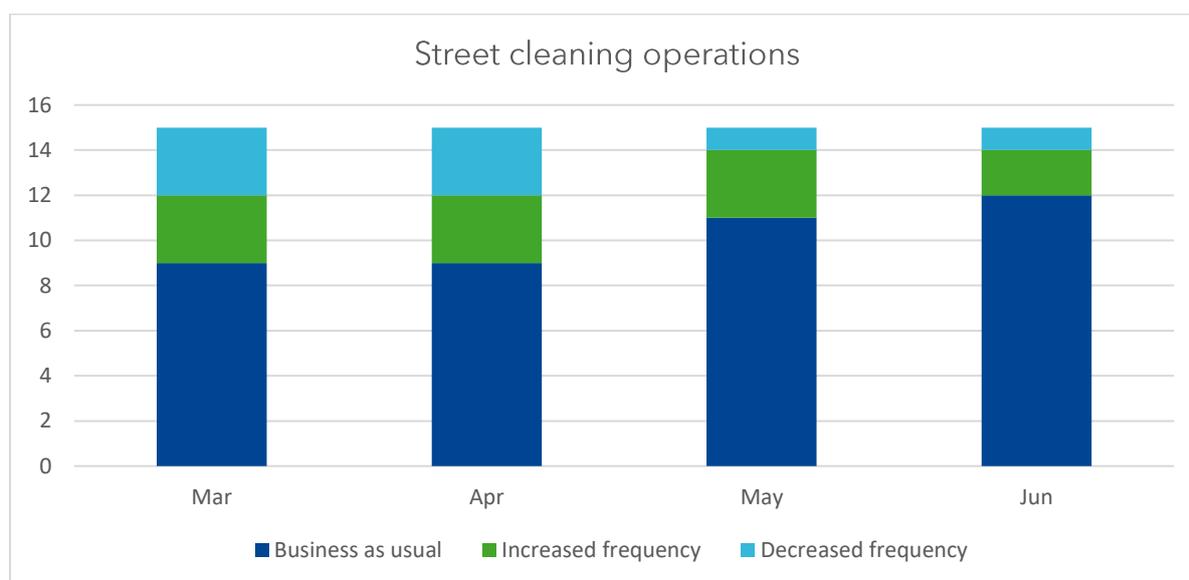


Figure 10: evolution of the street cleaning operations in the respondents' territories

Waste tonnages collected through the street cleaning services and the emptying of public bins showed variable results within the panel. The following graph reports the respondents' answers expressed as

SURVEY ON THE IMPACT OF THE COVID-19 PANDEMIC

percentages of the panel. In many territories, a decrease was observed, which can be linked with the restriction of movements and reduction of commuting in many areas.

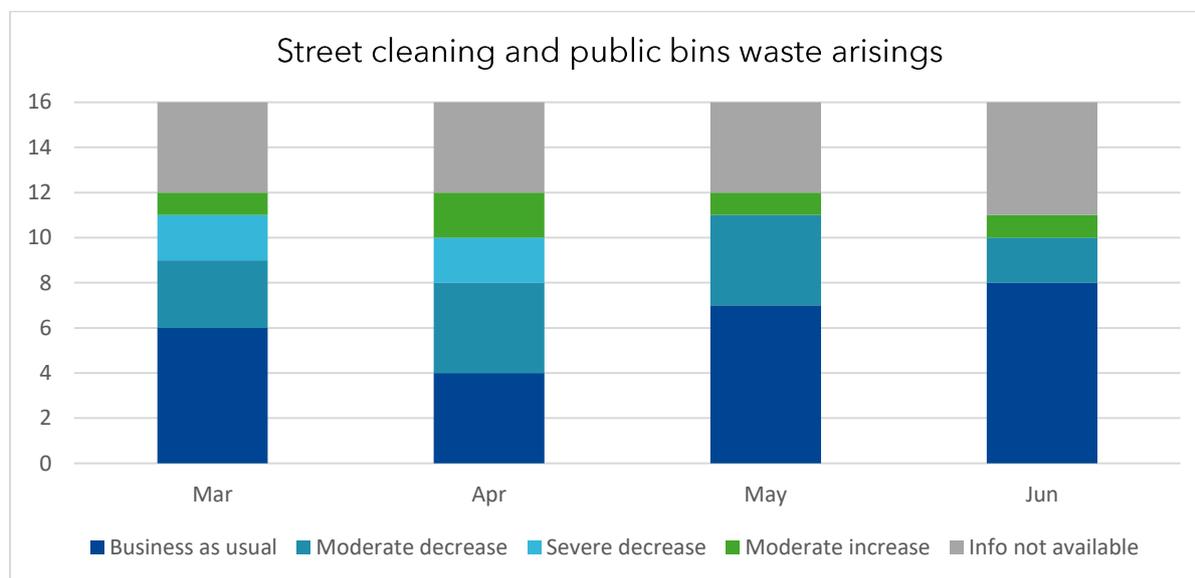


Figure 11: quantities generated by street cleaning and collected in street bins in the respondents' territories

3.5.7 Community composting

During the lockdown period, the community (or collective) composting system, i.e., composting carried out by different generators (mainly families) in the same shared and nearby area, kept on operating in all of the respondents' territories in which such service is available, with a variable intensity use by the citizens. The following graph takes into consideration only the respondents who provided an answer to this specific question.

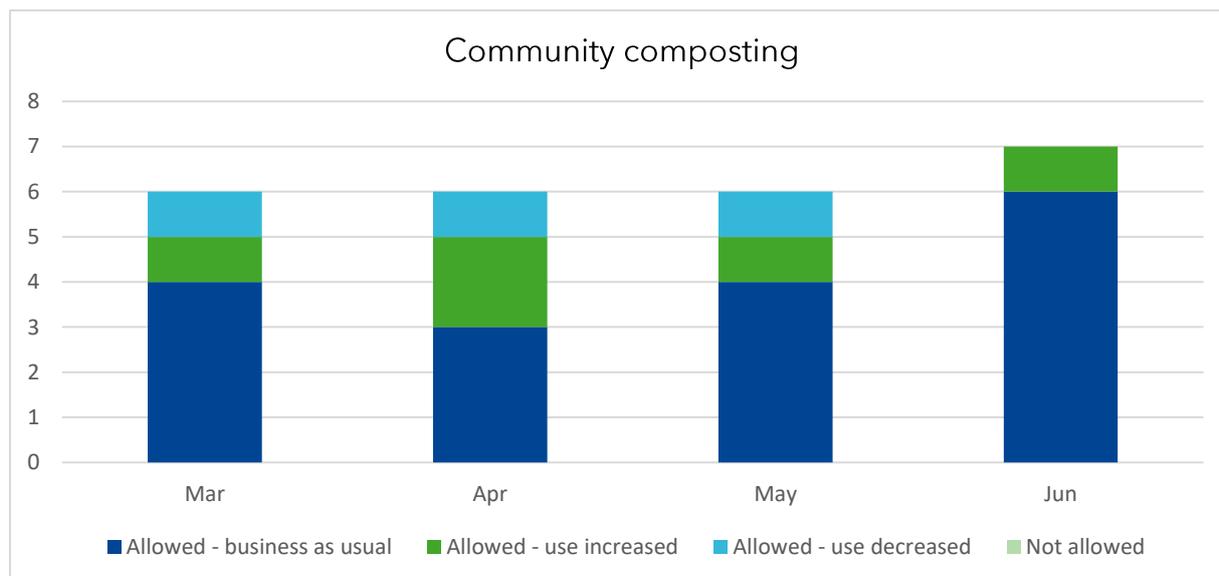


Figure 12: evolution of community composting in the respondents' territories

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Most territories kept community composting running; the use of community composting units increased or decreased in few territories, but no quantitative data is available.

3.5.8 Municipal waste treatment

Only one of the respondents reported a temporary modification of the mixed municipal waste treatment process during the lockdown, stopping the mechanical biological pre-treatment before landfilling as part of the emergency measures.

Concerning treatment of the organic fraction, few plants slowed down the operations during the lockdown period, as shown in the following graph:

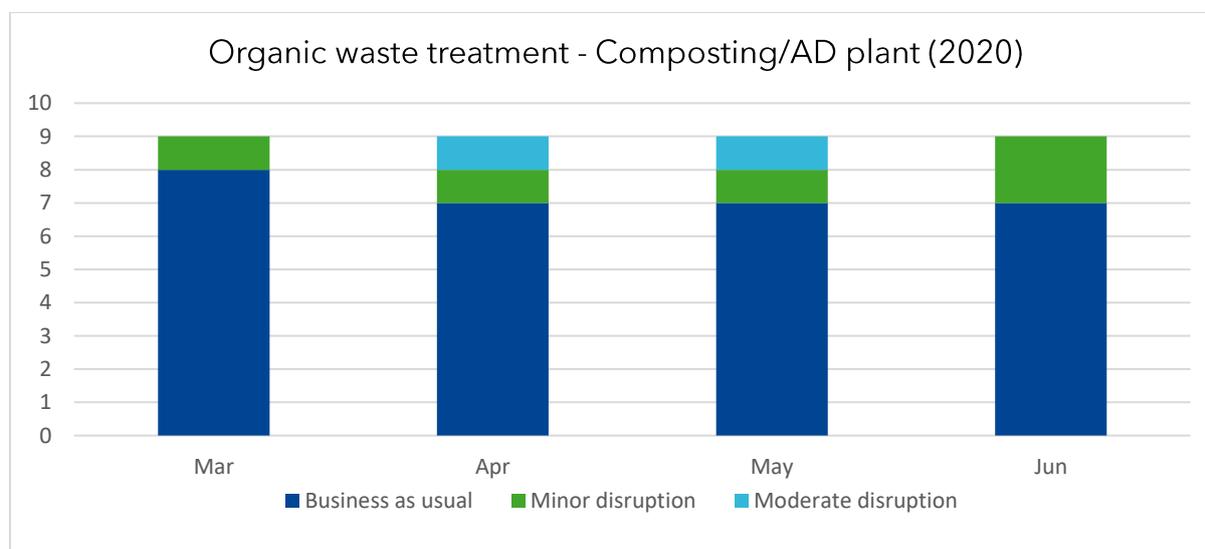


Figure 13: disruption of organic waste treatment facilities

The same observation can be made for packaging waste sorting centres: the vast majority of the panel did not face significant service reductions, but few of them experienced minor to sever disruptions.

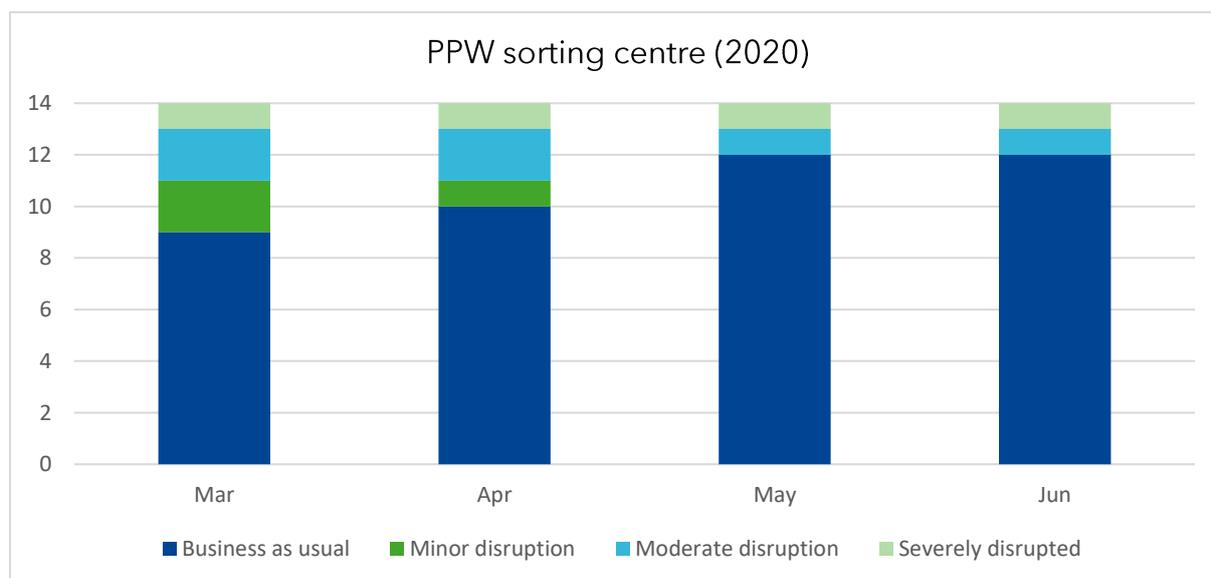


Figure 14: disruption of packaging waste sorting centres

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Five respondents also reported the introduction of preliminary temporary storage (“waste quarantine”) to reduce the potential viral load of the materials, in order to protect the workers.

3.5.9 Handling of waste from households with COVID-19 cases

The way waste from households in quarantine and/or with COVID-19 cases identified was handled varied from one place to another. International organisations and national authorities have provided guidelines during the first COVID-19 wave, and the classification of the municipal waste generated in households with COVID-19 cases varied from one country to another, or even at local level. The main information on the respondents’ measures regarding the handling of household with COVID-19 cases is presented on the graph below:

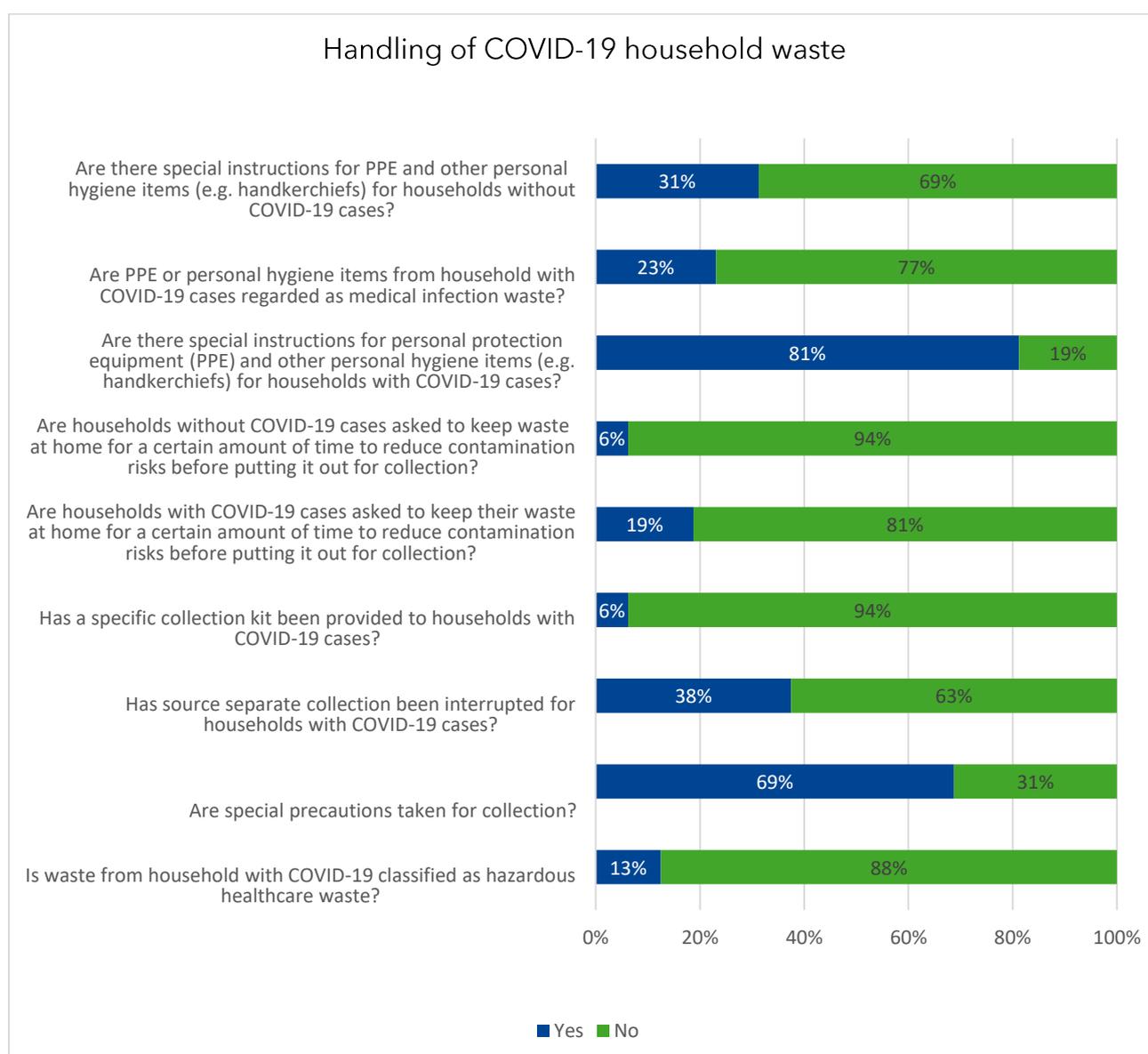


Figure 15: distribution of respondents according to the way COVID-19 households and non-COVID-19 households waste is handled

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Most respondents did not consider waste generated by household with COVID-19 cases as hazardous waste, but many of them introduced precautionary measures for handling them, such as double-bagging of waste including personal protective equipment (PPE, such as masks) or personal hygiene waste. In several cases, every household was given special instructions to dispose of their PPE as well (mostly double-bagging). Several respondents also asked contaminated households to keep their waste a certain time before presenting them for collection. Besides, about 40% of respondents indicated that source separation was interrupted for households with COVID-19 cases, that had either to dispose sortable waste with residual waste or wait before presenting them for collection.

A specific container dedicated to COVID-19 household waste (ES)



Figure 16: COVID-19 container in Almería - Copyright: Almería Ayuntamiento

In April 2020, the Municipality of Almería (ES) installed 40 containers next to the health centres and residences for elderly to collect separately waste of household contaminated by the COVID-19. Labelled “Household waste COVID-19”, those containers are similar to those used for the collection of municipal solid waste but are perfectly identified to exclusively deposit waste such as masks, handkerchiefs, gloves or utensils used by persons in quarantine or their families. In addition, as this waste must be put into three bags, the last of them being red, over 50,000 red bags have initially been distributed to health centres. In the event that infected household do not have a container nearby, they were able to deposit the red bag in the traditional waste container as the colour of the bag allowed it to be discarded at the entrance of the treatment plant and treated following the specific procedures established by law.

A month after their installation, [it has been estimated that 42 tonnes of waste](#) has been collected through these containers.

Source: [Almería Ciudad](#)

3.5.10 Staff management and working conditions

Contingency measures regarding human resources management were implemented by the municipal waste operators to keep on running the collection services. The main measures and distribution between respondents having or not having implemented them are presented on the graph below:

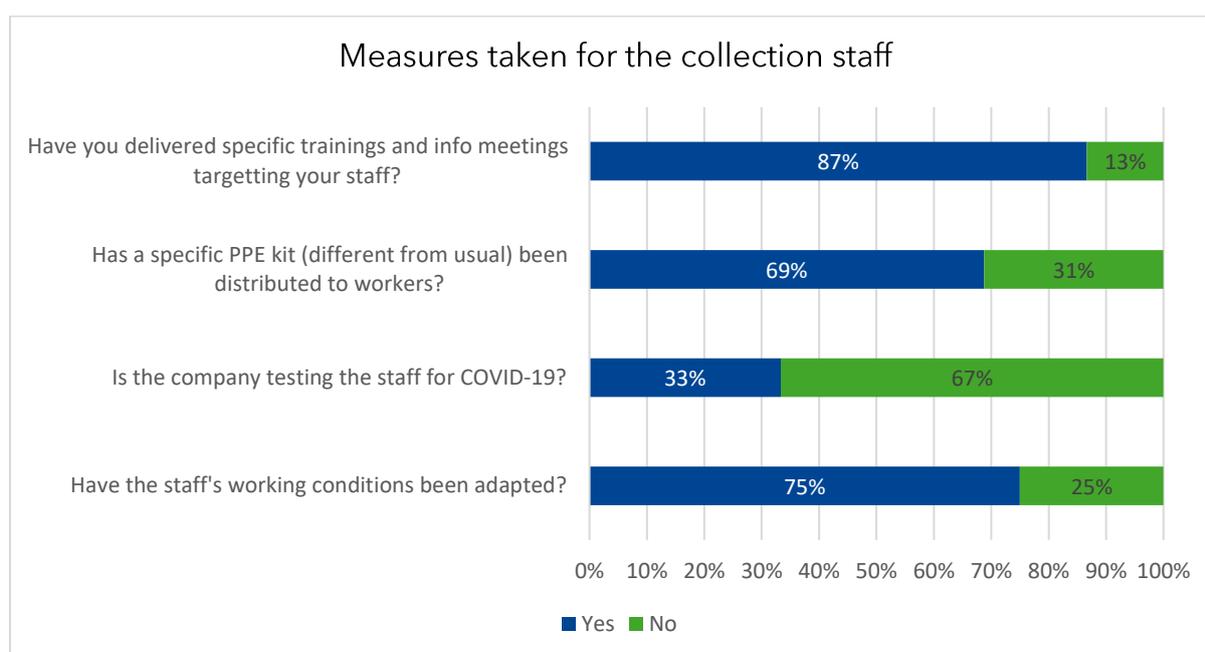


Figure 17: distribution of respondents according to their actions taken for the safety of staff

The vast majority of respondents have also reported specific training activities that were delivered to the staff during the lockdown period about safety measures to face the emergency situation.

Regarding the staff members tested positive to COVID-19, four respondents (R1, R5, R9, R15) delivered *in-house* testing to the staff. Few respondents reported the percentage of staff members tested positive, that ranges between 0.02 and 0.1%.

Staff was generally given PPE and gel, and sometimes specific equipment (e.g., FF2P masks) was given for the collection of COVID-19 households.

Shortages in the staff due to the pandemic sometimes significantly affected the operational capacity; one respondent reported an absenteeism rate of 15%, while the other few that replied reported figures ranging between 0.02% to 2%.

Some of the respondents reported about additional personal protective equipment delivered to the municipal waste collection service staff, such as FFP2 face masks, hydroalcoholic gel (for hands and the truck cabin), goggles, single-use gloves.

3.5.11 Communication activities

A variable set of communication actions were put in place by the respondents to support users with instructions and messages, in order to guarantee a sound waste management during the COVID-19 pandemic. More than 80% of the respondents reported increased communication activities and

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specific actions to promote the changes of service, and two third of the respondents indicated that they received increasing requests of information from the population during the lockdown period.

Only the respondents who provided an answer to this question are appearing in the table below.

	Website	Social Media	Phone App	Mail by post	Flyers	Posters	News-papers	Radio	TV	Info-line number	Other
R1	✓	✓		✓	✓	✓					
R2	✓	✓				✓		✓	✓		
R3	✓	✓									
R4											✓
R5	✓	✓	✓		✓	✓	✓	✓	✓		
R6	✓										
R7	✓	✓					✓	✓			
R10	✓										
R11		✓									
R12	✓	✓								✓	
R14	✓	✓									✓
R16	✓	✓	✓		✓						

The majority of respondents resorted to their online communication channels (website and social media). Interestingly, about 70% of the respondents communicated more on waste prevention as a way to reduce the pressure on the waste service.

Communicating with users on COVID-19 related waste management measures (IE)



To inform citizens about how to properly manage their waste, the Regional Waste Management Offices of Ireland are running MyWaste.ei, an online information portal providing information on local waste services; bring banks, recycling facilities along with ways to prevent, reuse and upcycle. The information portal quickly adapted to the COVID-19 by integrating a section on waste and COVID-19 which provides clear indications on the measures put in place. A series of visuals, guides, and videos have also been produced and shared on MyWaste and social networks.

Source: [My Waste](https://mywaste.ie)

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

The surveyed public authorities were asked to provide data about monthly tonnages of the municipal waste. The analysed timeframe refers to the period January-May 2020. January and February were included in the focus of the analysis as two months of business-as-usual scenario, in order to detect tendencies which are independent from the lockdown restrictions.

It is important to state here that the presented data have to be considered with care: the panel encompasses various situations, but cannot be regarded as representative of the situation across Europe. Besides, waste generation and collection are the consequence of various parameters, and monthly variations might not only be caused by the restriction measures. An analysis of data for the whole year 2020 could enable more conclusions on the impact of the pandemic. However, the elements presented below allow to identify several trends.

4¹ Analysis of the collected quantities

Ten out of the sixteen respondents provided monthly data about waste tonnages.

4.1.1 Total collected quantities

To better assess the potential impact of the pandemic and the measures taken, comparisons were made only taking into consideration the months when partial or full lockdown measures were implemented; these months are different from one territory to another. The quantities collected per inhabitant were assessed for these months, in 2019 and in 2020. Besides, the months during which no data was available were not included. These figures are presented on the following graph, including the three fractions for which data were collected:

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

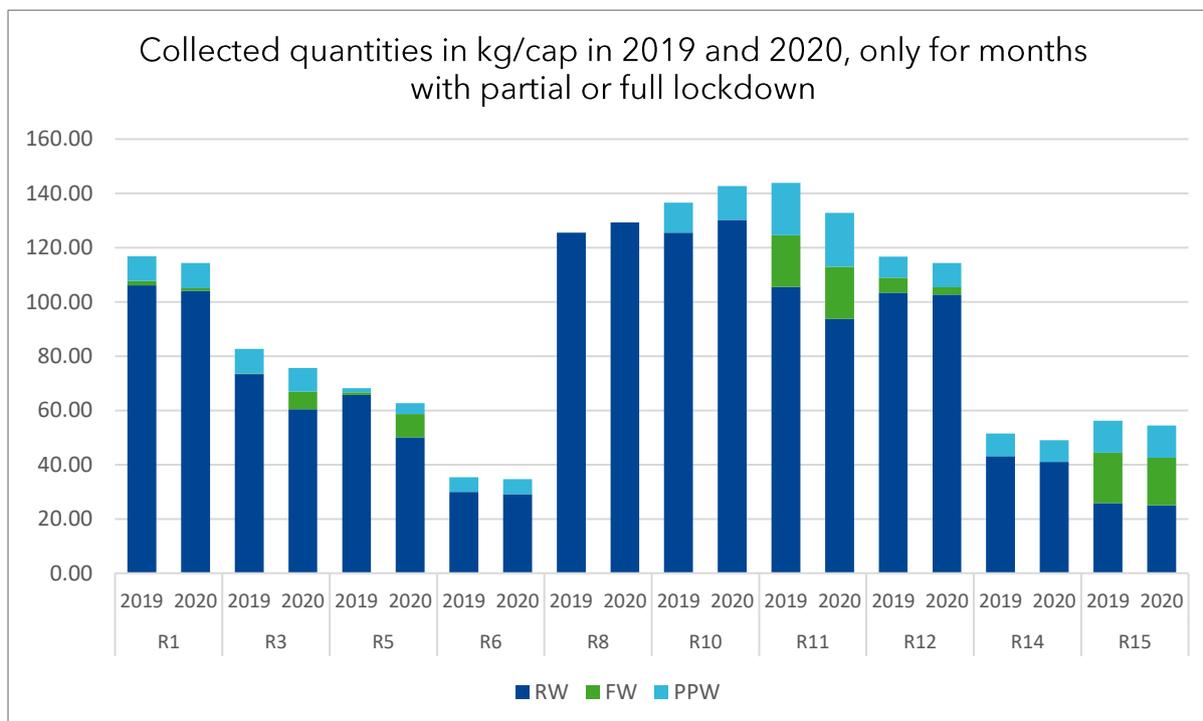


Figure 18: collected quantities per inhabitant in 2019 and 2020, only for the months with partial or full lockdown measures

Only two territories experienced a rather limited increase in the quantities collected (R8 and R10, with respectively +3% and +4% between 2019 and 2020), concerning both residual waste and paper and packaging waste. For R8, data is missing for PPW in 2020, making it impossible to see whether there was a transfer between sorted and unsorted waste.

The other respondents all experienced a decrease, and three of them (R3, R5, and R11) even reduced the collected quantities by 8% to 9%. Among these three, only one has a very high share of commercial waste. For these three respondents, the decrease mostly concerns residual waste, while food waste and paper and packaging waste either remain stable or experience a significant increase, linked with improvements brought to source separation between 2019 and 2020. For instance, both R3 and R5 implemented source separation for food waste in 2019 and 2020.

Overall, decreases are observed in April and May, when most respondents experienced restrictive measures. The following graph shows the total collected quantities by all respondents (only taking into consideration the streams that are documented for both 2019 and 2020).

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

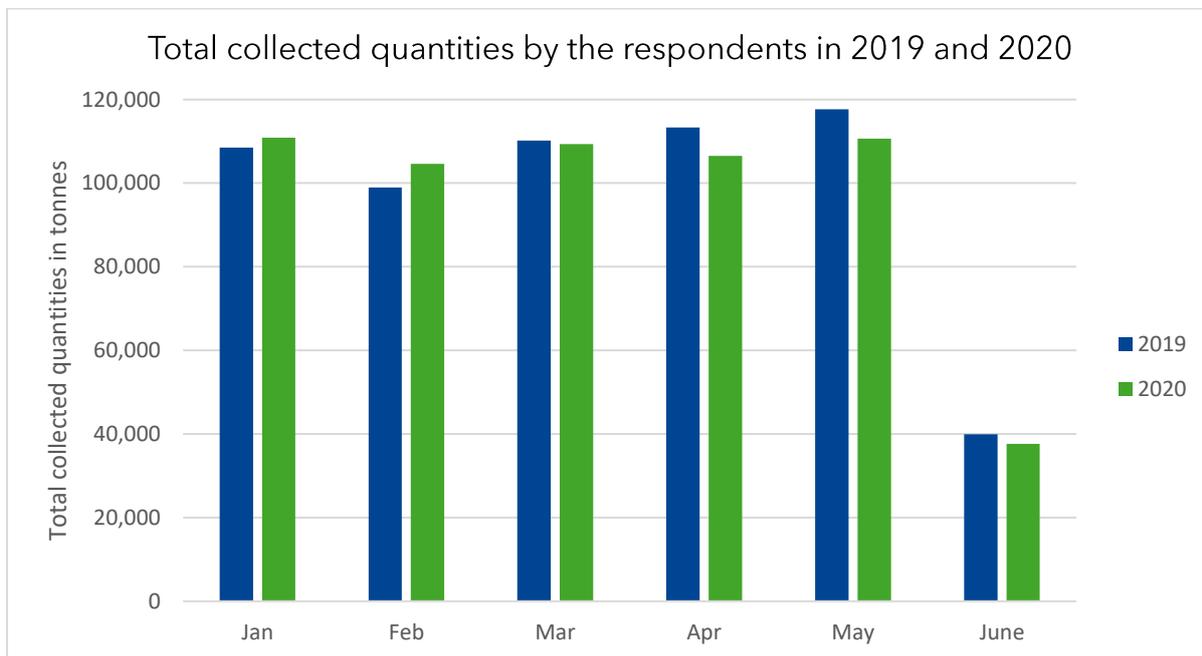


Figure 19: monthly collected quantities by all respondents for 2019 and 2020

The low quantities in June are due to missing data for several respondents in 2020; the data presented for 2019 only cover the respondents that also shared data in 2020.

Significant differences can be observed for one respondent (R14) without considering the timing of the local lockdown. The total collected quantities collected every month are presented on the following graph:

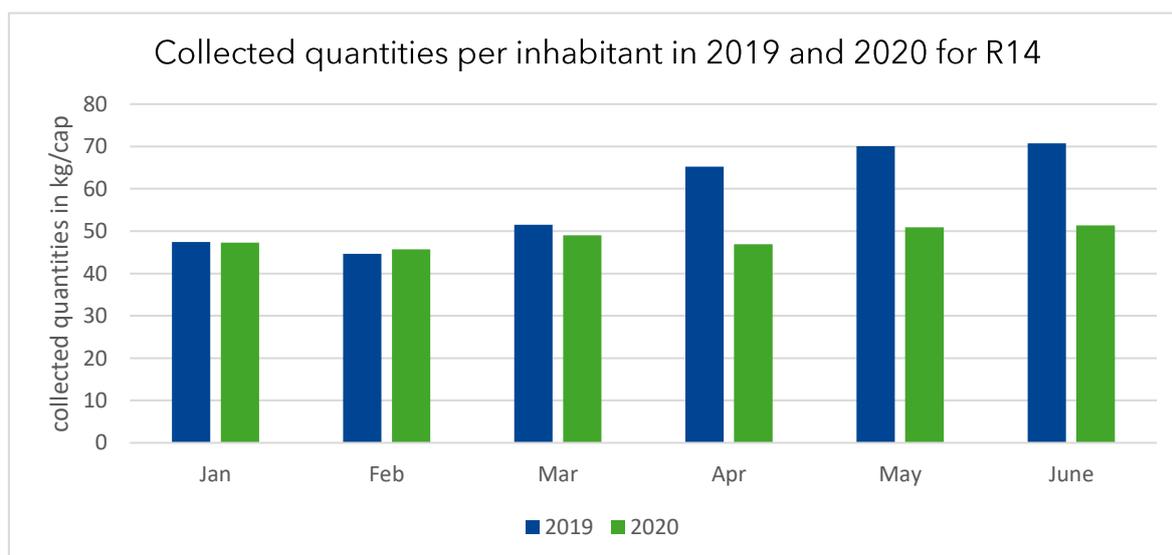


Figure 20: collected quantities per inhabitant in 2019 and 2020 for respondent R14

It is interesting to note that there are significant differences for April, May, and June: the collected quantities increased significantly in 2019 but remained stable in 2020. R14 being a very touristic area, it is likely that the closure of borders and the difficulty to travel during these months partly explain these differences.

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

When looking at the total quantities collected for the three covered waste streams (residual waste, food waste, and paper and packaging waste), different trends can be observed.

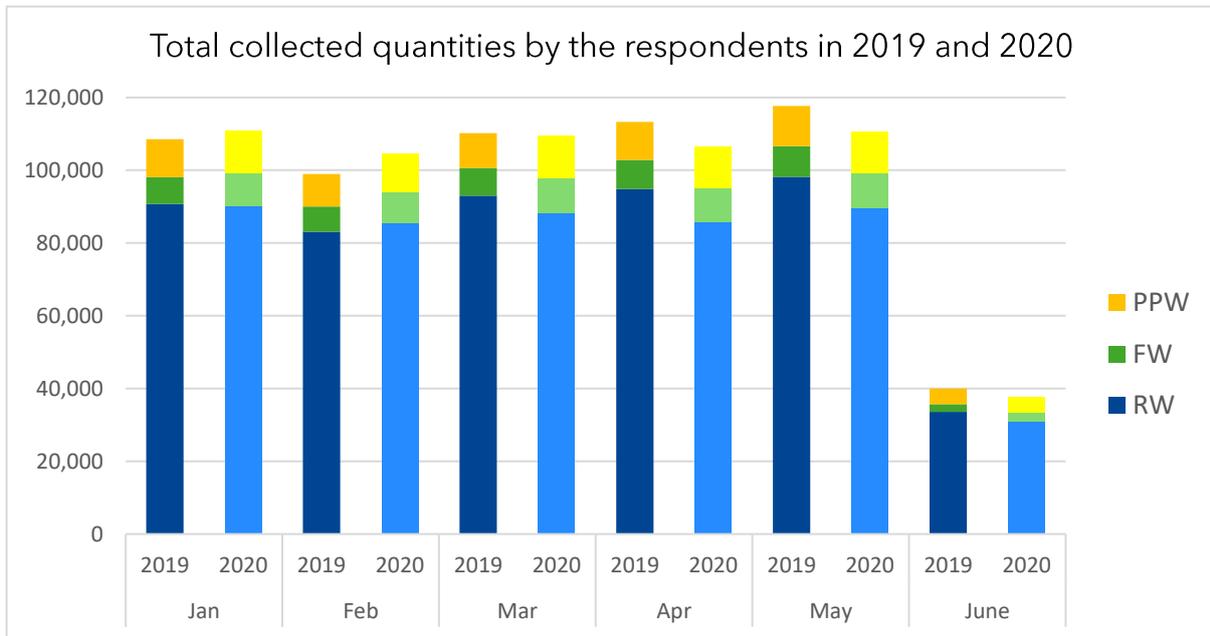


Figure 21: monthly collected quantities for the three covered streams by all respondents for 2019 and 2020 (the 2020 bars are presented in lighter colours to make the graph more readable)

The reductions observed in April and May mostly concern residual waste, while food waste and paper and packaging waste tend to increase.

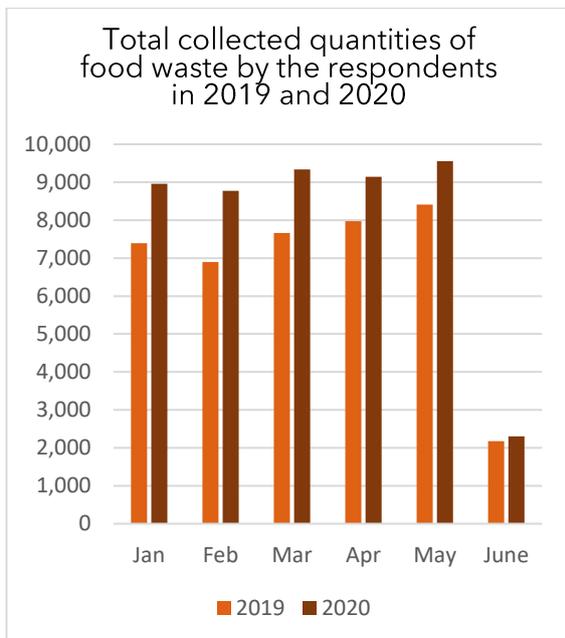


Figure 22: collected quantities of food waste for all respondents in 2019 and 2020

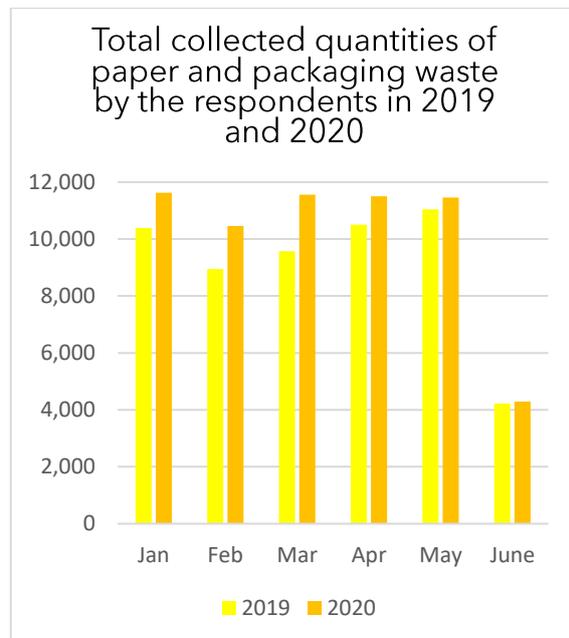


Figure 23: collected quantities of PPW for all respondents in 2019 and 2020

The graphs presented before show that both food waste and paper and packaging waste collected by all the respondents tend to increase, yet the increase is also noticeable in January and February.

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

Therefore, these differences are possibly linked with improvement of waste sorting in several of the covered territories. In March and April, the difference of collected quantities for PPW are less important, which could show that either PPW generation decreased, or that waste separation was less well performing.

Eight out of the sixteen respondents have provided monthly data about paper and packaging municipal waste tonnages. In the following graph the monthly percent variations comparing 2020 and 2019 are visualised.

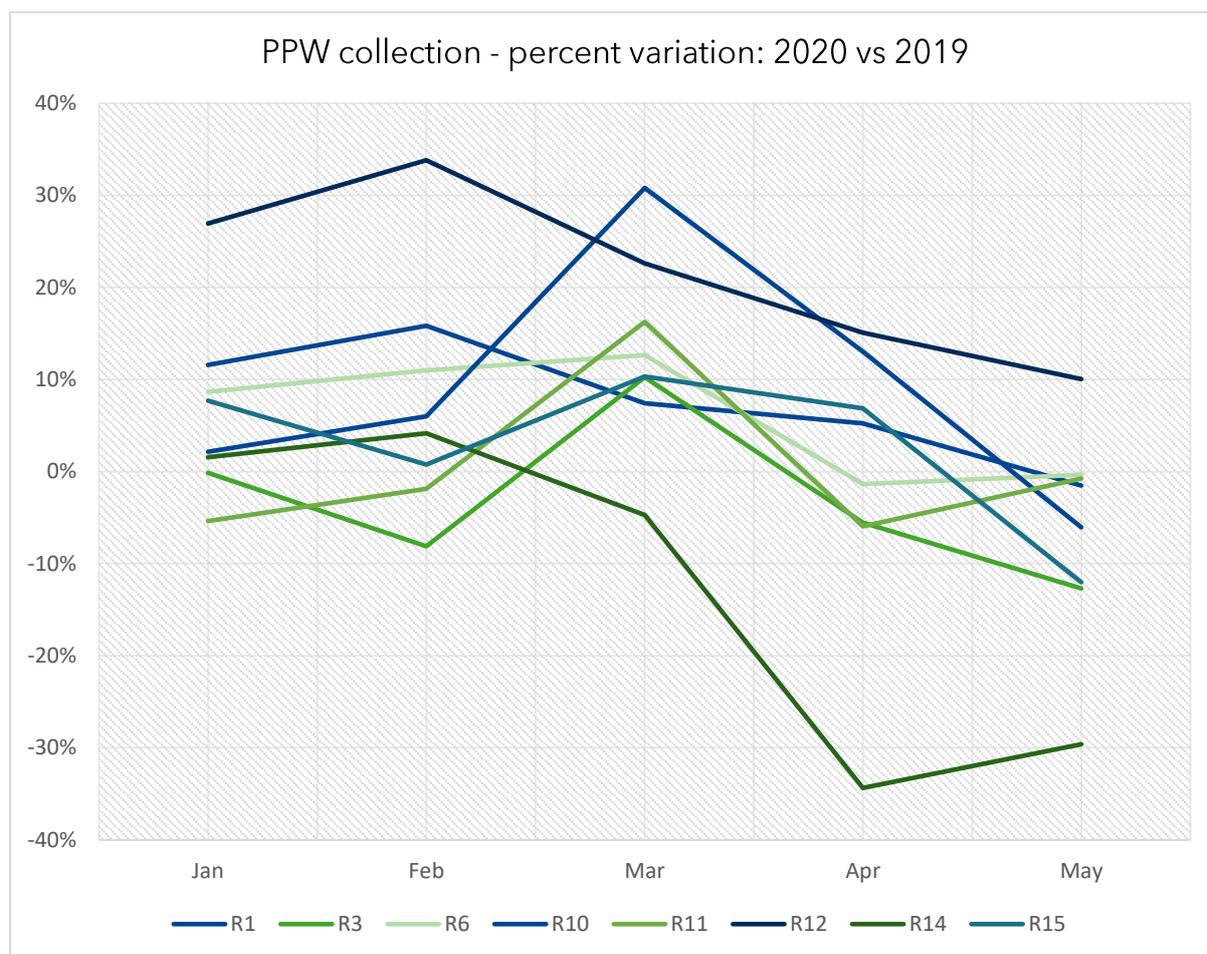


Figure 24: difference between the collected quantities of PPW for 8 respondents (in %)

The vast majority of the panel recorded higher positive differences of PPW collected quantities in January and February, but these differences tend to decrease in March, April, and May, with several respondents collecting even less PPW in 2020 than in 2019. The decrease is especially noticeable for R14, as explained earlier.

Six out of the sixteen respondents have provided monthly data about food waste tonnages. In the following graph the percent variations per month comparing 2020 and 2019 are visualised.

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

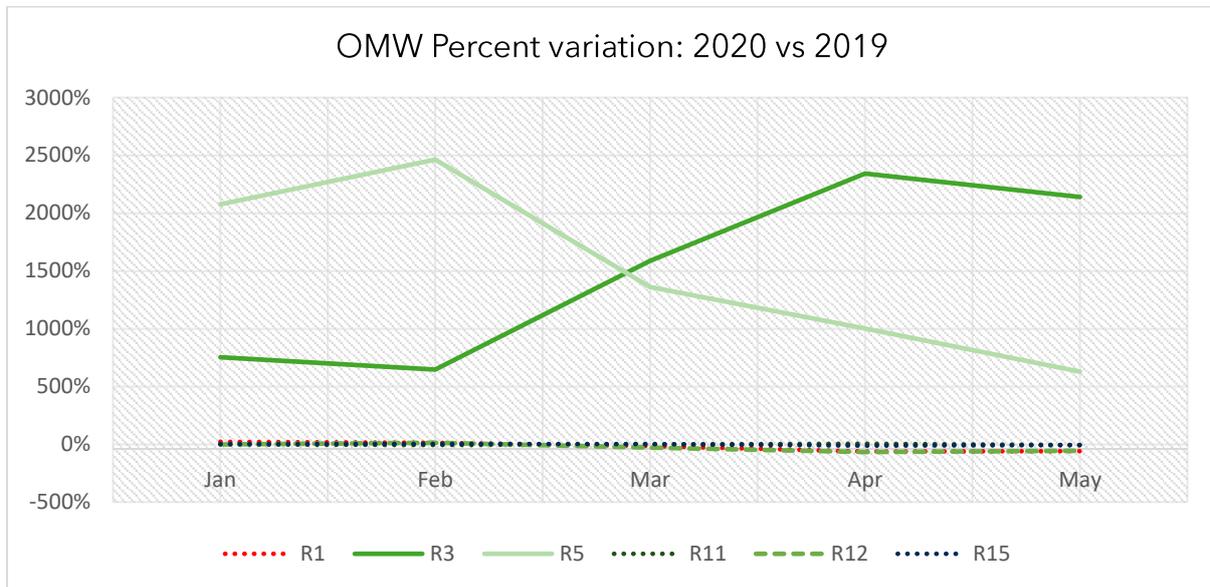


Figure 25: difference between the collected quantities of food waste for 6 respondents (in %)

Two respondents (R3 and R5) have significantly extended the source separated door-to-door collection service for the organic fraction as of January 2020. The other respondents collected comparable quantities between 2019 and 2020.

In order to detect variations related to the Covid-19 pandemic those two collection systems have been considered outliers. The residual and food waste arisings of the two outliers registered decreasing values in the lockdown period, ranging from 11% to 24%, even if declining tendencies were recorded also in January and February.

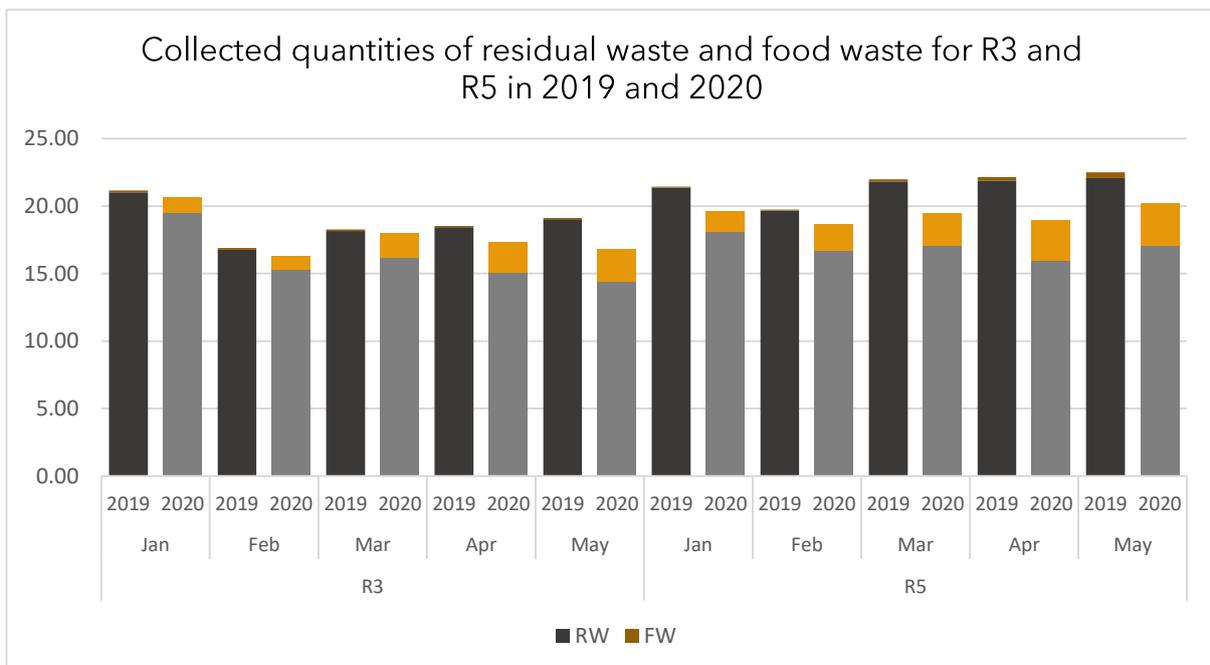


Figure 26: monthly collected quantities of residual waste and food waste for R3 and R5 in 2019 and 2020 (in kg/cap)

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

The majority of the respondents who provided data on their food waste tonnages (excluding outliers) have reported stable or declining tendencies of the organic fraction collected between March and May 2020 (figure 21), with monthly percent reductions varying from 67% (R12, the door-to-door collection frequency has been reduced from *every other day* to *twice a week*) and 6% (R15, the door-to-door collection service was kept on running the business as usual scenario with a *twice a week* frequency).

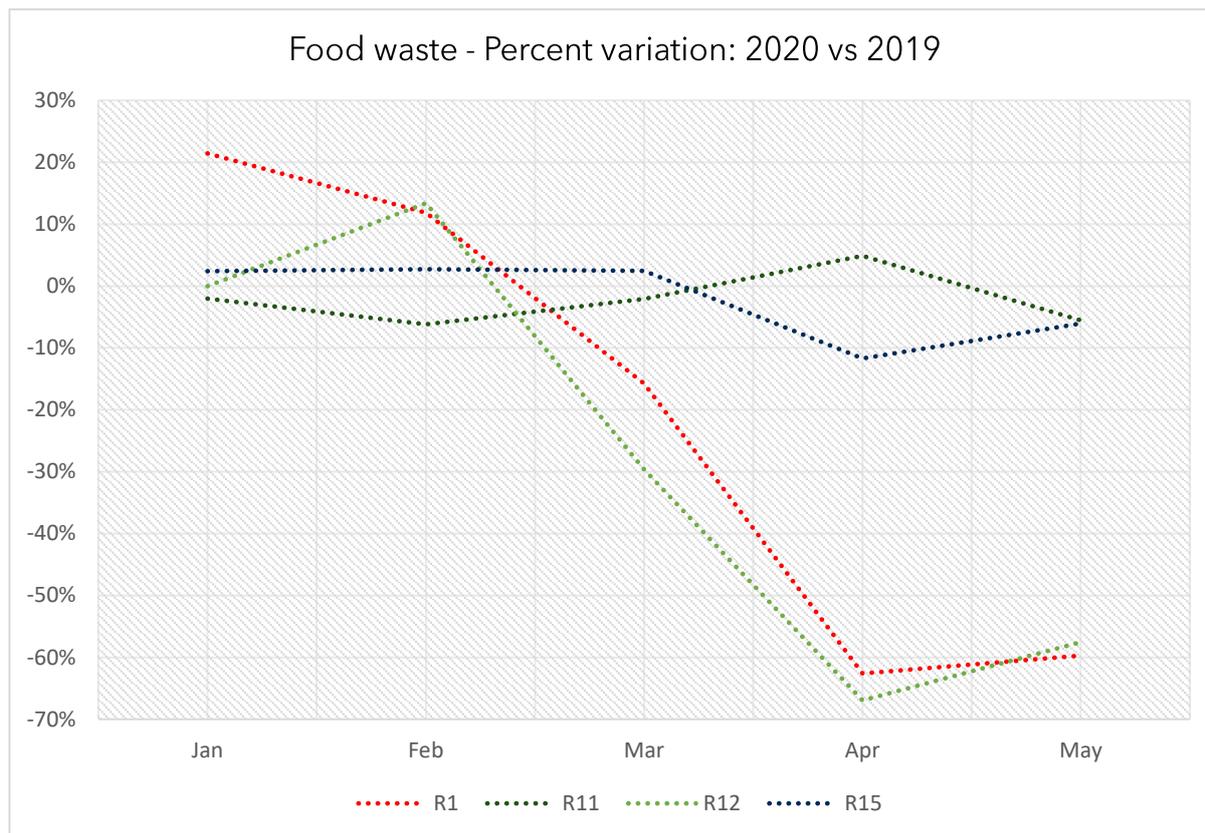


Figure 27: variation of collected quantities of food waste between 2020 and 2019 for four respondents

R15 has kept the same level of service but still experienced a sharp decrease; this might be linked with the closure of commercial activities, since about 46% of municipal waste in R15 territories is assimilated waste.

4.1.2 Source separated collection performances

In the following table, the monthly (March-May) tonnage percent variations between 2020 and 2019 are reported, in order to analyse the impact of the pandemic on the municipal waste source separated collection performances.

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

Table 7: monthly variation rate of collected tonnes between 2020 and 2019

	Monthly variation rate 2020-2019								
	March			April			May		
	RW	PPW	FW	RW	PPW	FW	RW	PPW	FW
R1	-3%	0%	-16%	0%	5%	-63%	-2.2%	-1.5%	-60%
R2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
R3	-11%	-18%	1586%	-18%	-6%	2342%	-24%	-13%	2141%
R4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
R5	-22%	-27%	1360%	-27%	163%	1001%	-23%	152%	629%
R6	0%	-11%	no service	-11%	-1%	no service	3%	0%	no service
R7	n/a	n/a	no service	n/a	n/a	no service	n/a	n/a	no service
R8	-1%	1%	no service	1%	n/a	no service	6%	n/a	no service
R9	n/a	n/a	no service	n/a	n/a	no service	n/a	n/a	no service
R10	6%	0%	no service	0%	13%	no service	2%	-6%	no service
R11	-8%	-6%	-2%	-6%	-6%	5%	-16%	-1%	-6%
R12	2%	-4%	-30%	-4%	15%	-67%	0%	10%	-58%
R13	n/a	n/a	no service	n/a	n/a	no service	n/a	n/a	no service
R14	-5%	-27%	no service	-27%	-34%	no service	-27%	-30%	no service
R15	0%	-2%	2%	-2%	7%	-12%	-8%	-12%	-6%
R16	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

The tonnages of residual, paper and packaging, and food waste showed declining tendencies in most of the respondents' data. The analysis of the gradients per fraction may be an indicator of how the collection services performed in terms of source separate collection.

The evolution of sorted fractions, and the associated sorting rates, are presented on the following graph, which includes all collected quantities from January to May 2019 and 2020:

IMPACT OF THE COVID-19 ON MUNICIPAL WASTE GENERATION

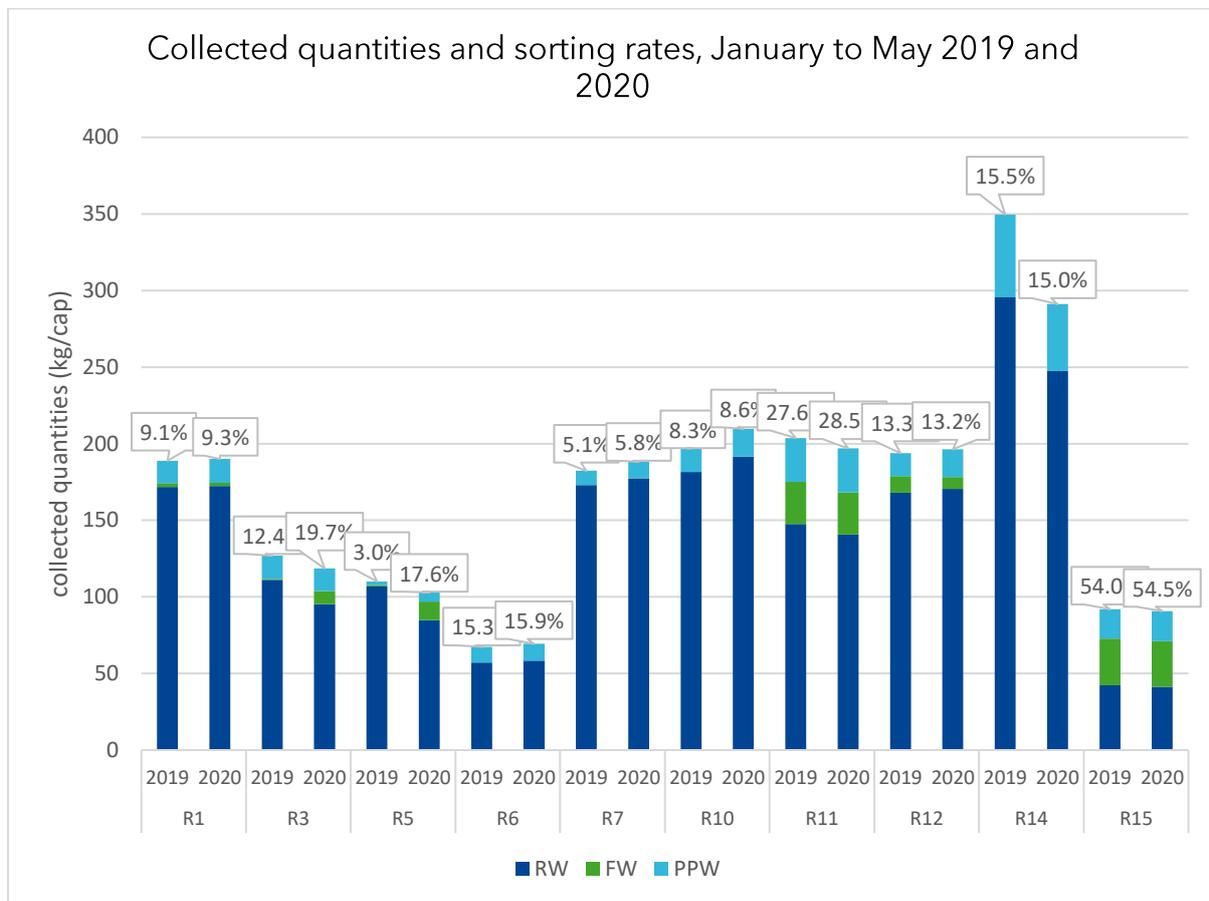


Figure 28: collected quantities and sorting rates for all respondents in 2019 and 2020, January to May (in kg/cap)

Most respondents experienced very slight increases or decreases of their sorting rates, with the exception of R3, R5, and R11. It seems that both R3 and R5 introduced and developed food waste collection between the two period, which explains the observed differences. However, both territories successfully managed to keep diverting food waste and PPW from residual waste between March and May 2020, meaning that the lockdown measures did not seem to impact the increasing performances.

When only looking at the months when lockdown measures were implemented, the same observations can be made regarding the evolution of sorting rates.

When it comes to the three territories that performed particularly well, other points can be listed:

- The civic amenity site services of R3, R5, and R11 faced some disruption in April, leading to a fly-tipping increase, but quickly recovered the business-as-usual openings in May (leading to a significant reduction in fly-tipping), while the on-demand services kept on operating the business-as-usual operations over the lockdown period. It should be noted that in R5 there was a strong earthquake in March 2020, generating significant volumes of bulky and construction and demolition waste, putting an additional pressure on the waste collection system.
- The treatment plants for paper and packaging waste and for food waste operated without disruptions during lockdown in the R3, R5, and R11 territories.

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- With regards to communication actions, R3, R5, and R11 reported a strong use of social media to deliver messages to citizens during the lockdown.

Several respondents also reported decreases of sorted quantities, either food waste or paper and packaging waste. The following observations can be made:

- R12 reported a reduction of the (door-to-door) collection frequency for food waste, which resulted in a sharp decrease (-28% between 2019 and 2020). The service for PPW was unchanged, and an increase of sorted quantities can be observed between 2019 and 2020;
- R14 reported a reduction of the collection frequency of PPW, which resulted in a rather important decrease (-19% between 2019 and 2020);
- The other respondent (R13) reporting a variation of the collection frequency for residual waste did not provide data about monthly tonnages.

Overall, this tends to show that the lockdowns did not impact the sorting habits, unless the collection services for separated fractions were interrupted or reduced. Territories that could keep the sorting systems running could maintain or even increase their sorting performances during lockdowns.

FINDINGS FROM OTHER STUDIES

Several other studies and sources of data on the impact of the COVID-19 pandemic were identified, and allow to give complementary perspective to the elements presented before.

5 ¹ Impact on collected quantities

Detailed data on the evolution of the collected quantities for different fractions were identified for several territories, such as the Region of Catalonia, or the city of Milan. These figures are presented below:

Catalonia (7,600,065 inhabitants)			
 In tonnes	Normal 1 month	COVID-19 1 month	Variation rate
Bio-waste	34,008.28	30,267.37	-11%
Paper-cardboard	26,193.38	15,715.03	-40%
Glass	15,890.81	11,123.57	-30%
Packaging	13,210.04	15,059.44	-14%
Total selective waste	89,302.51	72,166.41	-19.19%
Mixed waste	193,000	170,000	-12%

Figure 29: evolution of collected quantities in Catalonia (source: ARC, 16/04/2020)

Milan (1,390,434 inhabitants)	
	Weeks 10-14 2020 vs 2019
Residual waste	-24.4%
Paper-cardboard	-20.0%
Glass	-16.7%
Plastic and metals	-16.3%
Food waste (households)	-14.4%
Food waste (commercial activities at night)	-80.5%
Total waste	-27.5%
Street bins	-38.2%

Figure 30: evolution of collected quantities in Milan (source: AMSA³)

In both territories, the overall quantities declined for both the mixed and sorted fraction, in different proportions. The most significant decreases concern paper and cardboard and glass in Catalonia, and commercial food waste in Milan. It is likely that these decreases are connected with the closure of commercial activities and services such as HORECA establishments. These decreases seem consistent with what is observed on the territories covered by the survey. A summary of the impact and measures taken in Milan is available online⁴.

The “transfer” of waste from commercial activities to household has also been identified by the London Waste and Recycling Board (LWARB) that analysed the impact of the pandemic on the different boroughs in London⁵. The three Irish regional authorities for waste highlighted the same observation in a report summarising the impact of the first lockdown on waste management⁶. They report an increase of household waste by 21% (with comparable increase for residual waste and

³ https://www.acrplus.org/images/project/Covid-19/AMSA_Waste_management_during_COVID-19.pdf

⁴ https://www.acrplus.org/images/project/Covid-19/AMSA_Waste_management_during_COVID-19.pdf

⁵ LWARB, 2020, *How local authority waste services responded during the COVID-19 pandemic*

⁶ Regional Waste Management Offices, 2020, *Performance of the Waste Sector in Ireland - Covid 19 – Initial Restrictions Phase*

sorted waste), and a sharp decrease of commercial waste, and construction and demolition waste by 50%.

In most territories, it seems that sorting performances could be maintained when the service was not impacted. A survey launched by CITEO, the French EPR organisation for paper and packaging⁷, concludes that 78% of the surveyed citizens kept their recycling habits during the lockdown, and 63% even reported that they are more aware of their daily waste production and wish to reduce it. WRAP also reported a similar positive impact on behaviours toward food waste⁸.

5.2 Impact on occasional waste and civic amenity sites

Some local authorities, such as the Irish regional authorities, reported an increase of occasional waste (bulky waste, garden waste, construction and demolition waste, etc.), possibly linked with the lockdown measures and the fact that many people took this opportunity for small renovation works, gardening, or tidying up their housing. It resulted in difficulties to access civic amenity sites, even leading to traffic jams⁹.

The association of French local authorities AMORCE conducted different surveys¹⁰ during the lockdown period, which monitored the closure of civic amenity sites (CAS) and of sorting centres, as well as the suspension of selective collection routes. These figures tend to show that most CAS were closed in March (some being only open to business or communal waste), but they progressively reopened in April and May (sometimes with restrictions on the waste that could be brought). When it comes to separate collection, a large share of local authorities suspended bulky waste collection in March and April, while paper and packaging waste collection could be maintained by most local authorities during the lockdown (the suspension rate ranges from 30% in late March to 15% in late April).

These observations are shared by the London Waste and Recycling Board (LWARB)¹¹ whose survey reported that the changes of collection mostly concerned bulky waste and garden waste. However, it shows that almost all boroughs could not maintain business as usual services during the lockdown.

Many press articles reported increasing littering of gloves and masks. This particular aspect was not necessarily reported by local authorities within the survey or in the collection of information made by ACR+ as the impact on the waste service was limited. However, some measures were adopted to tackle this issue. This observation was also made by LWARB, with 42% of waste authorities experiencing increases of fly-tipping.

⁷ <https://www.citeo.com/le-mag/malgre-la-crise-sanitaire-le-geste-de-tri-resiste/>

⁸ <https://wrap.org.uk/content/food-waste-and-covid-19-survey-3-life-flux>

⁹ <https://www.gelderlander.nl/nijmegen-e-o/nijmegen-ruimt-massaal-op-file-bij-milieustraat~ad9a9ea0/>

¹⁰ <https://amorcer.asso.fr/boite-a-outils-dechets-gestion-des-dechets-et-coronavirus>

¹¹ LWARB, 2020, *How local authority waste services responded during the COVID-19 pandemic*

MAIN CONCLUSIONS

The survey conducted by ACR+ led to the identification of interesting trends, even though local specificities make it challenging to identify common trends. Overall, a decrease of collected quantities could be identified, probably linked with the decrease of commercial waste generation, yet local authorities could maintain or even increase their sorting performances. The interruption and disruptions of services, linked with staff shortages or safety measures, had quite an impact on collection. The reduction of collection frequencies generally led to lower sorted quantities, and the closure of civic amenity sites and/or interruption of on-demand collection of bulky waste seemed to entail an increase of fly-tipping, even though other unidentified factors might have had an influence.

According to the analysis carried out in this report, the systems that better adapted to the first COVID-19 wave (approximately March-May 2020) operated collection services with a business-as-usual collection frequency, providing users with steady source separate collection services. The reduction of waste generated by businesses most probably gave a room to a reallocation of resources to guarantee the services, yet this option was only available to waste authorities handling commercial waste. The flexibility of the staff (from the management to the operational level), the capacity to implement measures to guarantee safety operations, the clarity of information released by the government are some of the crucial points that can be regarded as good practices. The panel top performers in terms of source separate collection rate during the lockdown operate door-to-door collection systems, even if other respondents reported comparable results either operating door-to-door or bring bank systems. Communication actions are crucial to deliver high municipal waste management performances during emergencies and social media channels were generally reported as the most effective by the panel.

It is challenging to come up with recommendations based on the cross-analysis of quantitative performances with the measures taken. In general, local authorities had to balance different parameters: providing an essential service to citizens, keeping the staff safe, maintaining sorting performances, and tackling illegal practices.

The results of the COLLECTORS survey, the review of measures implemented at national, regional, and local level, and other studies and guidelines identified allow to list the following key recommendations for handling waste collection in time of pandemics. These recommendations are detailed in COLLECTORS guidelines¹².

- **Flexibility** is key to ensure the continuation of priority collection services, and the territories that could maintain good collection were the ones that could re-allocate resources among the different collection schemes (e.g., from commercial waste to household waste collection). It might be relevant to multi-skilling the operational staff to help them to fulfil different operational roles to improve the resilience of the service.
- **Keeping civic amenity sites open** with adequate measure can be recommended. Online booking systems received very positive feedback from users, but also from staff.

¹² COLLECTORS project, 2020, D4.5. *Guidelines for successful implementation*



MAIN CONCLUSIONS

- **Define priority levels** for collection services, focusing on collection modes limiting the interactions with inhabitants, or on specific waste fractions (e.g., residual waste, food waste, etc.). Keeping collection frequencies for sorted fractions greatly contribute to keep sorting performances steady.
- **Give priority to online communication** to reach inhabitants, provide clear information and simple, coordinated messages, and explaining the reasons behind changes. Taking advantage of the local media can also be recommended. It is also recommended to take the opportunity for giving the priority to messages on waste prevention.
- **Establish a consistent and continuous reporting** of the evolution of quantities.
- **Tackle illegal practices** such as fly-tipping by setting a closer monitoring, the enforcement of the regulation, an adequate communication, and ensuring that alternatives collection systems are still available (such as civic amenity sites).
- **Take advantage of guidance**, support systems and networks, to identify good practices and recommendations.
- **Follow UNEP recommendations** regarding the management of waste from COVID-positive households.

The questions asked in the survey appeared to be challenging to answer, possibly due to difficulties in collecting data in such a short time frame. A significant number of territories have started to fill out the survey without completing the submission stage. The major criticalities concern data about monthly tonnages. More information should be available when public authorities disclose their data on 2020.



ANNEXE

Summary of the measures taken in several European countries

Table 8: overview of national recommendations and measures implemented at local and regional level across Europe during the first wave of the pandemic

Regions	Measures taken
Austria	
Upper Austria Land Salzburg Vienna	<ul style="list-style-type: none"> ▪ Citizens asked to reduce waste and keep source separation ▪ Social distancing when disposing of waste ▪ Corona-infected household waste has to be disposed in the residual waste, interruption of selective collection. ▪ COVID-19-infected waste (tissues, etc.) has to be put in smaller, tearproof bags tightly closed and put in the residual bin ▪ Reallocation of teams between collection, street cleaning, and other municipal services, three different shifts organised to limit contacts among staff members
Belgium	
Brussels Region Wallonia Region Flanders Region	<ul style="list-style-type: none"> ▪ Specific circular to address staff shortages and set priorities and essential services for waste authorities ▪ Priority given to door-to-door and bring collection, which limit contacts between inhabitants and staff / reduction of collection in re-use centres and CAS (access limited to batteries, used oils, WEEE, hazardous waste) ▪ For door-to-door collection, priority to residual and food waste ▪ Priority given to high-densely populated areas ▪ Reduction of collection frequency for recyclable waste over a short period of time ▪ Inhabitants asked to keep residual waste 7 days before putting it for collection ▪ If the household is positive, double bag the residual waste ▪ Communication by waste authorities on changes in collection guidelines and CAS, and reasons behind these changes
Croatia	
Zagreb	<ul style="list-style-type: none"> ▪ Disinfection and washing of residual waste containers by the waste authority at a defined schedule
Czech Republic	
National recommendations	<ul style="list-style-type: none"> ▪ National guidelines for used personal protective equipment ▪ For COVID-positive households, masks should be put in in a plastic bag with a minimum thickness of 0.2 mm and disinfected (or use 2 bags); ▪ Local authorities must determine processes to store and dispose waste from COVID-positive households, in agreement with the public health authority
Estonia	
National recommendations	<ul style="list-style-type: none"> ▪ Different storing and collection routes for infected/quarantined people. Such waste must be placed in a sealed bag and disposed as residual waste, with no source separation, and not handled manually. ▪ For CAS, the following arrangements must be made to maintain the service: re-arrangement to ensure social distancing, citizens should be asked to avoid using them, waste should not

	be processed manually and stored 72 hours before treatment, no cash payment, and disinfectant available
Finland	
National recommendations	<ul style="list-style-type: none"> ▪ National recommendation published by the end of March, on prioritisation of waste management activities and waste collection ▪ Instruction to households: in case of delay for waste collection, store the waste in a sealed bag in a place where no one and no animal can access ▪ Tissues and napkins can be disposed in bio-waste (it was advised to put them in residual waste for a short period of time but it was reassessed as safe) ▪ Collection of infected households to be collected in specific routes
France	
National recommendations	<ul style="list-style-type: none"> ▪ Derogation to dispose of (incinerate or landfill) waste for which it is usually not authorised, and the usual penalised taxes on disposal for such waste are lifted. ▪ Guidance on the protection of waste collection staff, especially for medical waste, PPE for collection and sorting staff ▪ Household and medical waste handling is regarded as essential and services should be maintained. CAS should define a minimum service for businesses (e.g. for construction and demolition waste), if possible.
Amiens Métropole Grand Besançon Métropole Nantes Métropole Paris	<ul style="list-style-type: none"> ▪ Interruption of bulky waste collection and textile waste collection, and partial interruption of selective collection in specific areas or for commercial waste ▪ Closure of CAS (not included in authorised movement for the population) and collective composting units ▪ Cancellation of reusable diaper renting systems ▪ Potentially infected items should be put in sealed bags ▪ Re-organisation of teams to limit the number of agents at the same location and ensure their rest.
Germany	
National recommendations	<ul style="list-style-type: none"> ▪ Business as usual for non-infected household ▪ For infected household: all waste in residual waste, with bags sealed., except for glass, deposit packaging, WEEE, batteries and hazardous waste that must be disposed as usual.
Bavaria	<ul style="list-style-type: none"> ▪ COVID-19 positive households must dispose of their tissues and similar waste, as well as packaging from where food was eaten (e.g. yoghurt cups) in residual waste; beside glass waste, other fractions should not be sorted. ▪ Recommendations on waste treatment: residual waste to be delivered in secure bags. ▪ In case of shared containers, household must store them as much as possible and only dispose of them shortly before collection
Ireland	
National recommendations	<ul style="list-style-type: none"> ▪ €1 M funds to help local authorities deal with illegal dumping during lockdown (to cover waste removal and CCTV installation) ▪ Specific recommendations for waste generated by a contaminated person: in residual waste, tie the bag when $\frac{3}{4}$ full, and put the bag in another bag, and store the bag 72 hours before putting it for collection ▪ The three regional authorities issued a report to summarise the impact of the first lockdown on waste management, key decisions, strengths and vulnerabilities.
Italy	
National recommendations	<ul style="list-style-type: none"> ▪ For municipal waste generated by COVID-19 positive households, waste is regarded as infectious medical waste (hazardous waste), and handling must comply with the regulation for this waste. To make it possible for municipal waste services, adaptations were enforced, e.g.: <ul style="list-style-type: none"> ▪ All waste is regarded as residual waste, double bagging, daily collection. The bags have to be tied (with string or adhesive tape) using single use gloves; ▪ Do not press the bags with hands;

	<ul style="list-style-type: none"> ▪ Do not allow pets getting close to waste bags; ▪ Deliver the waste for collection according to the system in place; ▪ If the person in isolation/quarantine cannot deliver the waste for the collection service, the local authority must set up a specific service with specialized staff. ▪ Municipal waste generated by other inhabitants comply with the “usual” system, and have to put tissues, masks, and single-use gloves in residual waste, using 2 bags. ▪ Waste staff has to wear PPE and sanitize vehicle cabins ▪ Specific guidelines were also published with recommendations for municipal waste management and treatment
Basilicata Region Emilia-Romagna Region Calabria Region Piemonte Region Tuscany Region	<ul style="list-style-type: none"> ▪ Publication of orders and notes on municipal waste management on treatment plants, waste from healthcare facilities, and waste from COVID-19 positive households ▪ An ordinance on COVID-19 households include: <ul style="list-style-type: none"> ▪ The identification of the concerned household communicated by the local healthcare unit ▪ Special kit delivered by the local waste facility to the household (with bags, tape, and special bin ▪ Collection operated every 3/5 days upon phone call, as residual waste collection, which is stored apart from other residual waste ▪ Treatment of waste in selected incinerators, without any pre-treatment
Milan Treviso	<ul style="list-style-type: none"> ▪ Limited number of CAS opened, with limited number of users accepted, reduction of sweeping service ▪ Specific sanitation activities in street and public areas ▪ Protection equipment distributed to workers ▪ Specific communication campaigns to citizens (website, smartphone app, flyers, social media, letters to building managers)
Luxembourg	
Luxembourg	<ul style="list-style-type: none"> ▪ Interruption of on-demand collection for bulky waste, still available for grass clippings ▪ Closure of CAS, then opening limited to 12 vehicles on site ▪ Closure of second-hand shops ▪ Mobile and door-to-door collections of occasional waste were interrupted
The Netherlands	
The Hague Amsterdam	<ul style="list-style-type: none"> ▪ Many people cleaned their house, making CAS too busy. Citizens asked to access CAS only in real necessity ▪ Collection routes started earlier as a preventive measure to ensure the health of workers
Norway	
National recommendations	<ul style="list-style-type: none"> ▪ Higher demands in some CAS, leading to some closures. People are asked to keep their waste home ▪ Possibility to rent private containers for bulky waste ▪ Some municipalities set unattended hazardous waste collection points ▪ Temporary changes in landfilling permits or permits to carry waste to other locations ▪ Several recommendations for local authorities: <ul style="list-style-type: none"> ▪ Inform households on changes and instructions via social media ▪ Limit CAS access to specific waste fractions, and ban cash payment
Portugal	
National recommendation	<ul style="list-style-type: none"> ▪ Specific orders to ensure the continuity of waste management services ▪ Guidelines and recommendations for municipal waste management (protecting workers) ▪ In case of lack of capacity, recyclable waste must be disposed with residual waste ▪ Keep selective collections as much as possible to avoid overloading residual waste ▪ Possibly contaminated materials (masks, gloves, etc.) should be put in residual waste in sealed bags. ▪ Municipalities must foresee possible disruption and prepare for increasing residual waste collection, but changes should be limited to avoid waste deposited in the streets.

	<ul style="list-style-type: none"> ▪ Priority given to incineration over landfill when possible. MBT must be stopped ▪ Storage of municipal selectively collected waste during 72 hours.
Serbia	
Belgrade	<ul style="list-style-type: none"> ▪ Disinfection of disposal containers ▪ Instructions to citizens to keep sorting habits and avoid fly-tipping
Slovakia	
National recommendations	<ul style="list-style-type: none"> ▪ Continuation of waste collection services but CAS, that were then partially re-opened ▪ Masks, tissues and gloves to be put in sealed plastic bags and put in residual waste bags.
Spain	
National recommendations	<ul style="list-style-type: none"> ▪ A special Order was published giving instruction on household waste collection and treatment, as well as healthcare waste. ▪ Household with COVID-19 cases have to dispose their residual waste sealed and deposit them in the locations indicated by the municipality. For other household, no changes are required. ▪ Bags from places where high levels of COVID-19 cases are identified (residences, hospitalised hotels, etc.) have to be identified by a specific mean (tape, sticker, etc.) and deposited in specific containers as indicated by local authorities, to have a specific treatment ▪ When it comes to treatment, incineration is given the priority, and no manual handling of waste or pre-treatment should be performed. ▪ A 72-hour storage can also be decided by the local authorities. ▪ Gloves, masks, etc. from healthcare centres will be assimilated to infection medical waste and handled as such. ▪ Competent authorities may require the coordination of waste management companies to handle the infectious waste, and cement plants allowed to co-incinerate waste can be required to treat it. ▪ Instructions are given for people infected with COVID-19: any disposable material used by positive people should be put in a bag, then sealed, and put in another bag before being deposited in the household garbage bad.
Andalucia Catalonia Ayuntamiento de Palma Mancomunidad de Debagoiena Balearic Islands	<ul style="list-style-type: none"> ▪ Regional guidelines provided by regional governments, based on national instructions ▪ Instructions published online to citizens, including prevention instructions to reduce the quantities, and to store occasional waste (WEEE, etc.) ▪ Guidelines were published on waste prevention for businesses ▪ Masks, gloves, wipes, etc. should be disposed in sealed plastic bags and disposed as residual waste ▪ PPE for staff of treatment units and reduction of manual operations, 72-hour storage for waste before recovery. ▪ If there is a lack of treatment/recovery capacity, all waste must be sent to disposal, preferably incineration. ▪ Increase of collection fees was cancelled to reduce the impact on households and commercial activities affected by the lockdown.
Sweden	
National recommendations	<ul style="list-style-type: none"> ▪ Guidance on classification of waste regarding their infectious character ▪ The risk of contamination through household waste was assessed as low, so waste from contaminated household is managed as usual. However, waste that is potentially contaminated by airway secretion or bodily fluids (tissues, diapers, etc.) should be disposed in sealed plastic bags
Switzerland	
National recommendations	<ul style="list-style-type: none"> ▪ Household contaminated by COVID-19 should put all their waste in the residual bin ▪ Masks, tissues, etc. must be disposed in sealed bags and put in residual waste bins ▪ CAS must be kept open with or without staff (in this case with posters providing guidance). Citizens must be instructed not to use CAS for non-perishable or clean waste. ▪ PPE and protective measures must be ensured for workers



ANNEXE

United Kingdom

England
Scotland
Central Scotland

- Specific regulatory position statements allowing longer storage time than indicated in the permits, for incinerators to treat waste potentially infected by COVID-19, and for healthcare workers treating patients at home to dispose of PPE waste in residual waste
- Priority should be given to residual waste, food waste, and recyclable should be maintained if possible
- Municipalities are invited to re allocate staff for the priority waste services
- Priority waste streams are residual waste, food waste, fly-tipping, and healthcare waste
- Medium priority waste is dry recyclable, CAS, commercial waste
- Low priority is bring sites, weekly collection of dry recyclables, garden waste bulky waste
- Waste potentially contaminated (used for cleaning or by infected person) must be put in two bags, sealed, and stored out of reach during 72 hours

ACR+ is an international network of cities and regions sharing the aim of promoting a sustainable resource management and accelerating the transition towards a circular economy on their territories and beyond. Circular economy calling for cooperation between all actors, ACR+ is open to other key players in the field of material resource management such as NGOs, academic institutions, consultancy or private organisations.

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