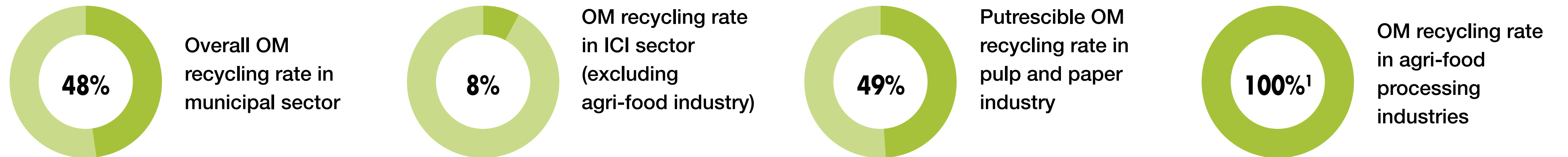


## Organic materials

The last few years have been marked by the start-up of several composting and anaerobic digestion plants as well as progress in implementing organic materials (OM) collection in Quebec, thus diverting these materials from disposal to recycling. This helps all sectors, both the municipal sector and the industrial, commercial and institutional (ICI) sector, which now have new opportunities to exploit organic material and allow this precious resource to return to the earth.

*For ease of reading, results have been rounded off. It is therefore possible that the totals or percentages in the tables and the figures do not fully match the totalled results.*



### Overall profile of organic material recycling and disposal

The overall recycling rate for all sectors, including data from the agri-food processing sector, is estimated at 56% (more than 2.6 million tonnes), a 12 percentage points increase compared to 2018. The quantity of OM generated is slightly above 4.6 million tonnes for 2021, which is lower than in 2018, when the quantity was estimated at nearly 5.2 million tonnes.

The overall recycling rate for putrescible organic materials (excluding the agri-food sector) went up 15 percentage points between 2018 and 2021 to 42%. In total, in 2021, nearly 1.5 million wet tonnes were recycled by composting, anaerobic digestion or landspreading in Quebec by the various sectors. This improvement can be seen for the municipal and ICI sectors (including pulp and paper mills).

Interestingly, quantities of organic materials sent to anaerobic digestion increased compared to 2018, which could be explained by the increase in housing units and the ICI sector being served by such facilities, and an improved rate of participation in these collections.

According to statements by respondents, the quantity of rejected materials for all composting and anaerobic digestion sites is estimated to be slightly over 36,000 tonnes, which is a rejection rate of 6% of the total nearly 593,000 tonnes of leaf and yard waste and food waste received by these facilities. These rejected materials are basically found in the leaf and yard waste and food waste received, and is considered a contaminant that is not compatible with processing through composting or anaerobic digestion. Quantities of rejected materials are therefore excluded from the following tables.

<sup>1</sup> Different methodology used for estimating quantities sent to disposal combined with likely underestimated quantities generated by that sector, could explain the higher recycling rate, which appears overestimated at 100%.

**Table 1**  
**Generated and recycled putrescible organic material in 2021<sup>2</sup>**  
(in wet tonnes<sup>3</sup>)

Sector	Total	Disposal			Recycling					2021 recycling rate	2018 recycling rate	2018 quantities recycled	2018-2021 variation in recycled quantities
		Landfill	Incineration	Total disposed	Animal feed and rendering	Composting	Anaerobic digestion	Landspreading	Total recycled				
Organic materials from municipal sector including sludge	2,092,000		1,089,000	1,089,000	N/A	593,000	63,000	346,000	1,002,000	48%	35%	675,000	48%
Sludge and putrescible organic material from pulp and paper mills	900,000	122,000	341,000	463,000	N/A	N/A	1,000	436,000	438,000	49%	34%	330,000	33%
Organic materials from ICI sector (excluding wood, agricultural waste, livestock manure and peat)	504,000		465,000	465,000	N/A	31,000	9,000	N/A	39,000	8%	5%	51,000	-24%
<b>Total (excluding agri-food waste)</b>	<b>3,496,000</b>		<b>2,017,000</b>	<b>2,017,000</b>	<b>N/A</b>	<b>623,000</b>	<b>73,000</b>	<b>783,000</b>	<b>1,479,000</b>	<b>42%</b>	<b>27%</b>	<b>1,057,000</b>	<b>40%</b>
Agri-food sludge and organic material	1,141,000		1,000	1,000	928,000	6,000	138,000	69,000	1,140,000	100%	97%	1,210,000	-6%
<b>Total</b>	<b>4,638,000</b>		<b>2,018,000</b>	<b>2,018,000</b>	<b>928,000</b>	<b>629,000</b>	<b>211,000</b>	<b>852,000</b>	<b>2,619,000</b>	<b>56%</b>	<b>44%</b>	<b>2,267,000</b>	<b>16%</b>

<sup>2</sup> Details or information on presented data are available in the Methodology section of this report. Quantities disposed of for “Organic materials from municipal sector” (excluding municipal sludge) and “Other ICI sector waste” have been calculated using the rates determined in the [2019–2020 Waste Disposal Characterization Study](#).

<sup>3</sup> Quantities presented represent materials as they are received at the processing site, with no adjustment for drying factor.

## Municipal sector

The municipal sector includes leaf and yard collection and food waste collection (brown bins) as well as municipal sludge (biosolids from water treatment plants and septic tanks). In total, this sector recycled 48% of the organic materials generated. This is a 12 percentage points increase compared to 2018.

OM collection getting implemented in Quebec municipalities no doubt helped drive up the recycling rate in this sector. At the end of 2021, the estimated number of municipalities offering such collection was around 660 (i.e., 60% of Quebec municipalities), a clear increase over 2018, when it was estimated to be slightly above 500.<sup>4</sup> In addition to these municipalities, some have opted for backyard composting in compliance with government requirements, thereby resulting in 62% of municipalities offering either of these services to their residents. Also note that more and more municipal organizations encourage residents to adopt green practices such as grasscycling and leafcycling, i.e., leaving grass clippings and leaf waste (shredded) on the ground. Quantities diverted by these activities are difficult to evaluate and not taken into account in the quantities presented in this information sheet.

Quantities of municipal food waste sent to anaerobic digestion facilities have almost doubled between 2018 and 2021, from 21,000 tonnes in 2018 to nearly 41,000 tonnes. This spike could be due in part to the implementation of new collections in areas served by anaerobic digestion facilities for that type of waste and possibly by a higher participation rate.

## Changing behaviours

### **Portrait of Quebecers' attitudes to 3R-RD** (2nd edition) (in French only)

Along with implementing various OM management methods, Quebecers' changing behaviours and attitudes to 3R-RD have also seemed to help improve the recycling rate. While in 2015, only 26% of respondents reported recovering food waste systematically or a lot. This percentage more than doubled and hit 53% in 2021. Participation in leaf and yard waste recycling also went up as 88% of respondents reported doing it properly in 2021 (compared to 81% in 2015). Of the households that still do not have access to this service, 68% believe it is important that the municipality offers this service.

The perception that it is very easy or fairly easy to recycle food waste is shared by 80% of respondents—a significant improvement over 2015 (42%).

The receptiveness to composting also keeps improving. More than eight out of ten respondents (83%) believe that people who participate in composting set an example for others. Nearly eight respondents out of ten (79%) believe that the benefits of composting are worth the time and effort required. Lastly, for 23% of respondents, the drawbacks of composting outweigh its benefits—a smaller proportion than in 2015 (30%), which indicates a positive change in Quebecers' perception.

<sup>4</sup> In 2020, RECYC-QUÉBEC estimated that 66% of Quebecers had access to door-to-door food waste collection, combined or not combined with leaf and yard waste.



The quantity of municipal sludge generated (including septic tank sludge) increased by about 100,000 wet tonnes between 2018 and 2021. This could be due to a higher quantity of wastewater to be treated and more municipalities emptying their sludge ponds. This fluctuation between years is normal; between 2015 and 2018, the situation was reversed, quantities of municipal sludge generated went down 100,000 tonnes. The recycling rate for municipal sludge also went up by 15 percentage points in 2021 compared to 2018, reaching 57%. Note that there was also a 15% drop in quantities of sludge sent to disposal, from 404,000 to 344,000 wet tonnes, which shows that municipal organizations want to cut down on landfilling and incineration of these materials.



Table 2  
**Generated and recycled organic materials from municipalities in 2021**  
(in wet tonnes)

Municipal organic material	Total	Disposal			Recycling				2021 recycling rate	2018 recycling rate	2018 quantities recycled	2018-2021 variation in recycled quantities	
		Landfill	Incineration	Total disposed	Animal feed and rendering	Composting	Anaerobic digestion	Landspreading					Total recycled
Municipal leaf and yard and food waste	1,298,000		745,000	745,000	N/A	512,000	41,000	400	553,000	43%	31%	387,000	43%
Municipal sludge	794,000	45,000	299,000	344,000	N/A	81,000	23,000	346,000	449,000	57%	42%	288,000	56%
<b>Total</b>	<b>2,092,000</b>		<b>1,089,000</b>	<b>1,089,000</b>	<b>N/A</b>	<b>593,000</b>	<b>63,000</b>	<b>346,000</b>	<b>1,002,000</b>	<b>48%</b>	<b>35%</b>	<b>675,000</b>	<b>48%</b>

Data on compost and digestate resulting from organic material treatment are presented in the [Quality and markets for composts and digestates](#) section of this information sheet.

Figure 1  
Destination of leaf and yard waste and food waste in the municipal sector in 2021

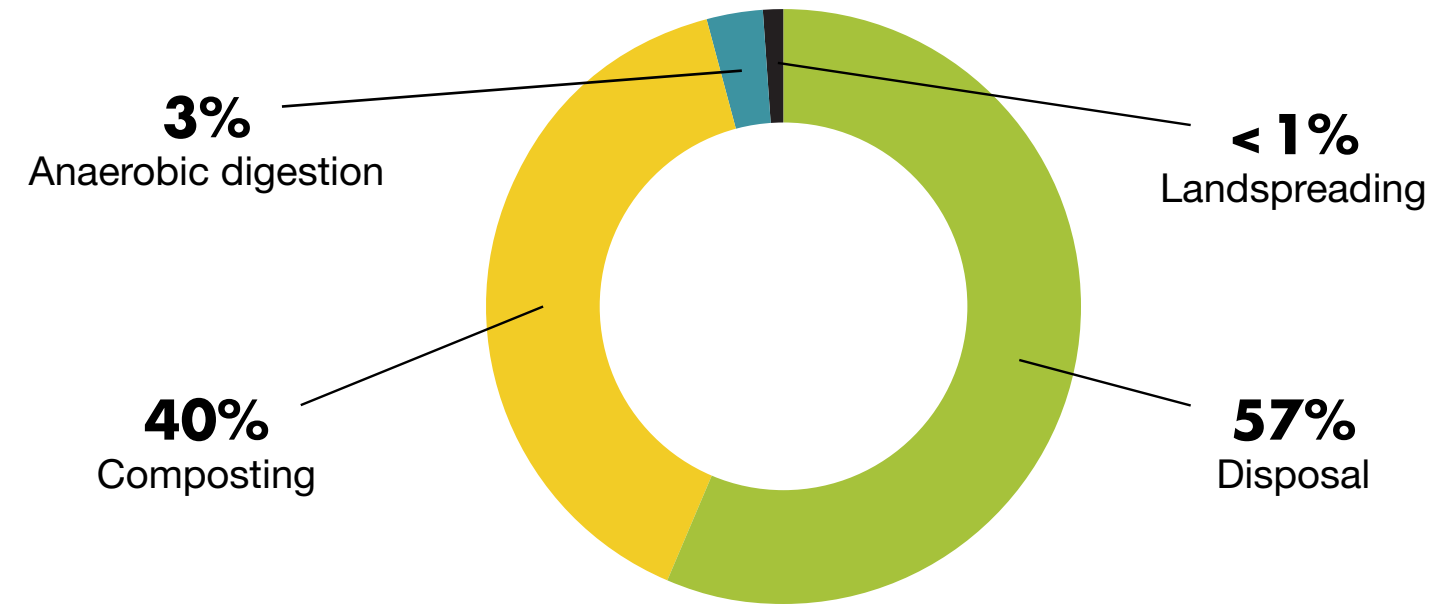
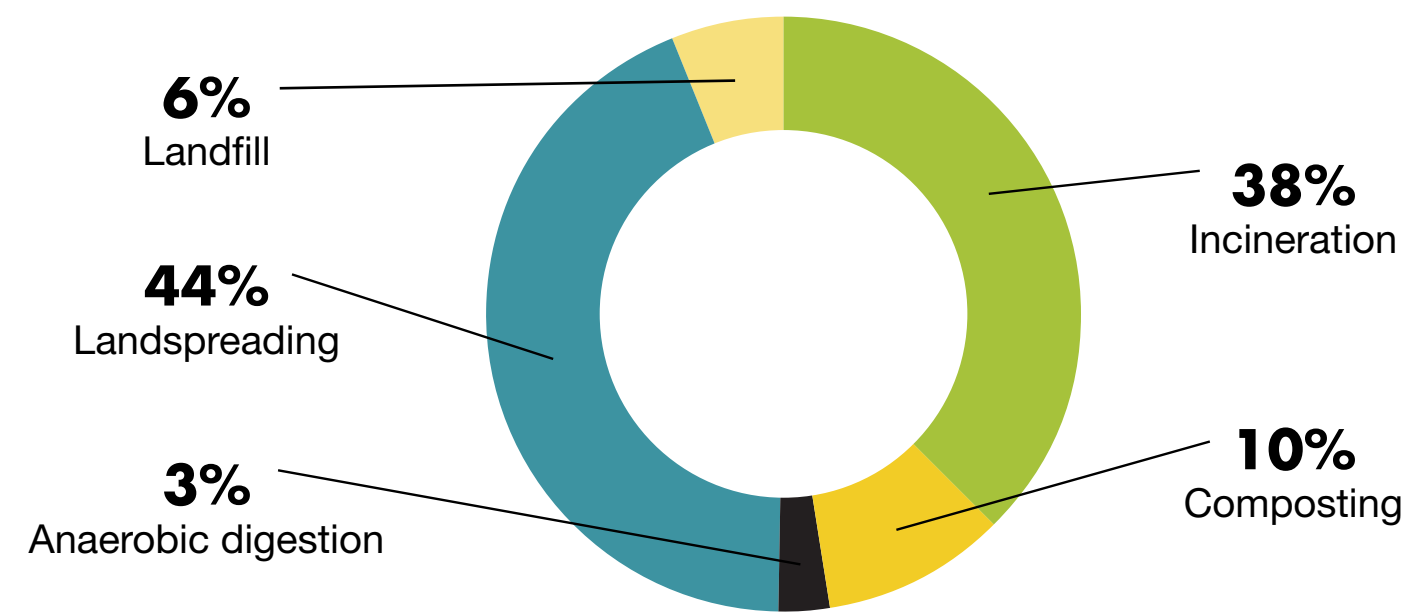


Figure 2  
Destination of sludge in municipal sector in 2021



### Edible food loss and waste

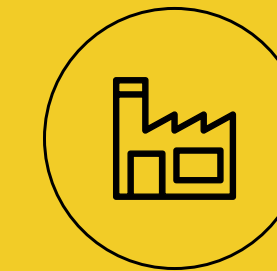
Edible food loss and waste refers to the diversion, spoilage, loss or rejection of any edible part of the food that is meant for human consumption, at any stage of the bio-food system.

According to RECYC-QUÉBEC's **Quantification Study of Food Loss and Waste in Quebec** published in 2022, 16% of the 7.5 million tonnes of food going into Quebec's bio-food system every year, i.e., 1.2 million tonnes, are lost or wasted, at different stages of the bio-food system.

### Distribution of Edible Food Lost or Wasted Through the Bio-Food System



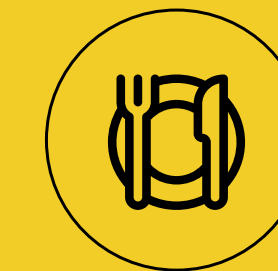
14%  
Production



21%  
Processing  
and manufacturing



10%  
Distribution



5%  
Hotels, restaurants and  
institutions (HRI)



22%  
Retail



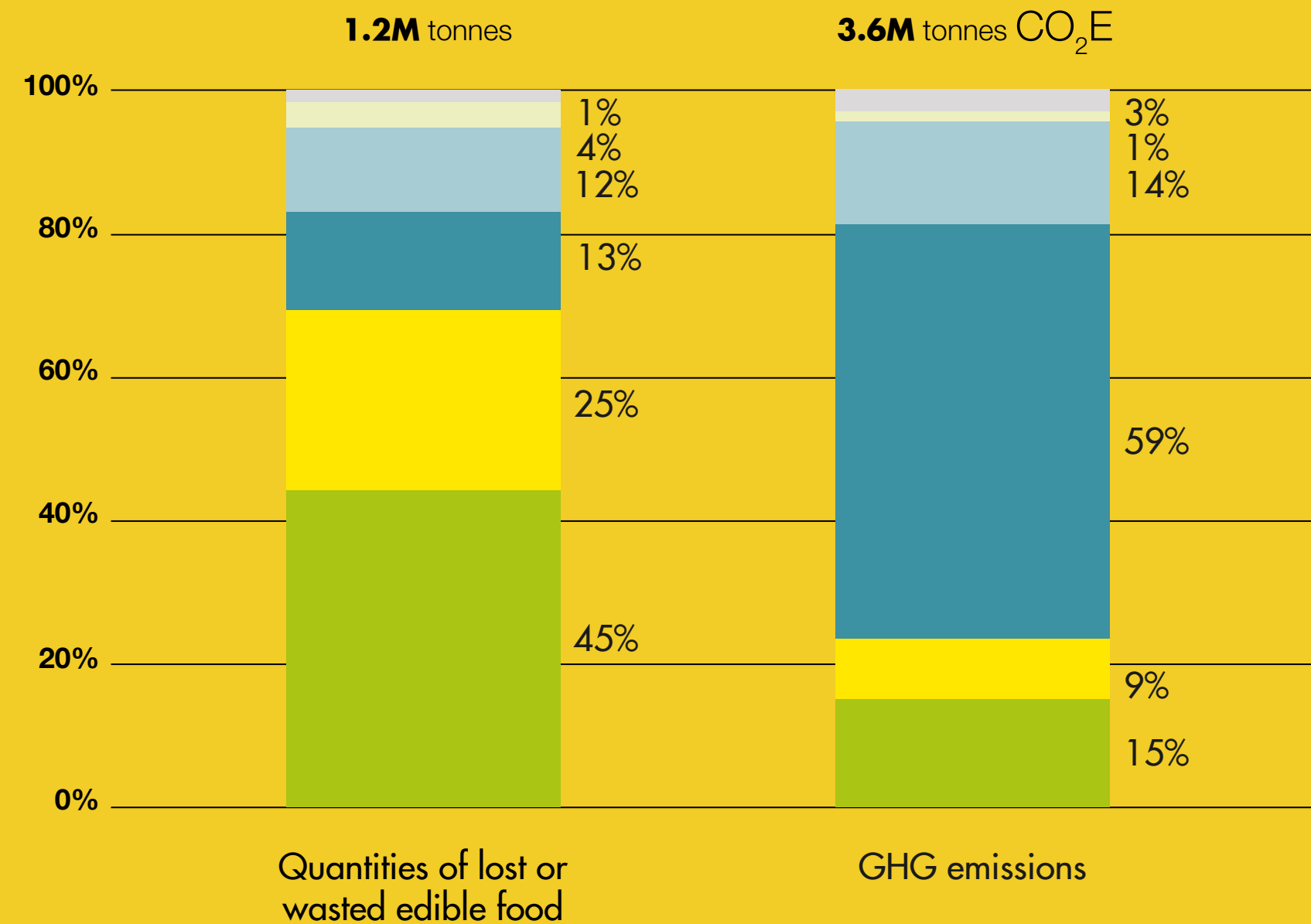
28%  
Households



Edible food loss and waste (cont'd)

This lost or wasted edible food results in 3.6 million tonnes of CO<sub>2</sub>E emissions every year, which is 18% of GHG emissions associated with Quebec's bio-food system.

Distribution of GHG Emissions by Category of Lost or Wasted Edible Food



- Fruits and vegetables
- Field crops
- Meat and poultry
- Dairy and eggs
- Sugars, syrups and confectionary
- Marine products

All actors in Quebec's bio-food system are called on to prevent food loss and waste. An array of information, tools and resources are available at the following links (in French):

- Citizens: [\*\*RECYC-QUÉBEC – Prévenir le gaspillage alimentaire \(Preventing food waste\)\*\*](#)
- Municipality: [\*\*RECYC-QUÉBEC – Réduction du gaspillage alimentaire par les citoyens \(Reducing citizen food waste\)\*\*](#)

ICI sector: [\*\*RECYC-QUÉBEC – Prévenir les pertes et le gaspillage alimentaires \(Preventing food loss and waste\)\*\*](#)

Industrial, commercial and institutional (ICI) sector

The ICI sector includes activities in the pulp and paper industry, agri-food processing industry and all other ICI sector industries (such as stores, restaurants, institutions). Businesses in this sector generate a wide variety of organic materials, so estimating such quantities is quite complicated. The ICI sector made up a large share (about 55%) of the 4.6 million tonnes of putrescible organic materials generated in Quebec in 2021.

The recycling rate for the ICI sector, excluding the agri-food and pulp and paper industries, had a slight 3 percentage points increase between 2018 and 2021, up to 8%. This change can be in part due to a significant drop in quantities sent to disposal between 2018 and 2021, from 968,000 tonnes to 465,000 tonnes, combined with a slight decrease in quantities recycled over the same period, i.e., from 51,000 tonnes to 39,000 tonnes.

What's more, the dip in quantities generated by "Organic materials from ICI sector waste" is likely partly due to the pandemic, notably in the restaurant, hotel and retail industries and the institutional sector (e.g., educational institutions). At the same time, although it is difficult to evaluate or confirm, it is also possible that the residential sector generated more food waste as the ICI sector was inactive for several months and more food was being prepared and eaten at home.



**Table 3**  
**Generated and recycled organic materials from ICI sector**  
(excluding agri-food and pulp and paper industries) (in wet tonnes)

Total generated	Disposal			Recycling				2021 recycling rate	2018 recycling rate	2018 quantities recycled	2018-2021 variation in recycled quantities
	Landfill	Incineration	Total disposed	Composting	Anaerobic digestion	Landspreading	Total recycled				
Organic materials from ICI sector (excluding wood, agricultural waste, livestock manure and peat) <b>504,000</b>		465,000	<b>465,000</b>	31,000	9,000	N/A	<b>39,000</b>	8%	5%	51,000	-23%

### Pulp and paper industry

In 2021, 36 pulp and paper mills operating in Quebec generated nearly 2 million tonnes of different types of residual materials, a significant 12% drop compared to 2018. From that quantity, 37% was recycled, which is a 3 percentage points improvement over 2018.



**Table 4**  
**Pulp and paper mill residual materials**  
(in wet tonnes)

	Total generated	Disposal			Recycling	Recycling rate
		Landfill (engineered landfill)	Landfill (mill site)	Combustion		
2018 pulp and paper mill residual materials	2,207,000	64,000	474,000	914,000	755,000	34%
2021 pulp and paper mill residual materials	1,949,000	41,000	340,000	843,000	724,000	37%
Variance (tonnes/year)	-258,000	-23,000	-134,000	-71,000	-31,000	-
Variance (%)	-12%	-35%	-28%	-8%	-4%	-

Putrescible organic waste alone accounts for nearly 438,000 tonnes that were recycled over a total of 900,000 tonnes generated, which is 49%, a clear increase compared to 2018, when it was estimated at 34%. Recycling activities, as reported by pulp and paper mills, basically include composting, valorization (for agriculture, forestry and other purposes) and site remediation.

**Table 5**  
**Generated and recycled putrescible organic materials in the pulp and paper industry in 2021**  
(in wet tonnes)

	Total generated (tonnes)	Disposal			Recycling				2021 recycling rate	2018 recycling rate	2018 quantities recycled	2018-2021 variation in recycled quantities
		Landfill	Incineration	Total disposed	Composting	Anaerobic digestion	Landspreading	Total recycled				
Sludge and putrescible organic materials from pulp and paper mills	900,000	122,000	341,000	463,000	N/A	1,000	436,000	438,000	49%	34%	331,000	32%



Figure 3  
**Destination of putrescible organic materials generated by pulp and paper mills**  
(in wet tonnes)



## Agri-food processing industry

Table 6  
**Generated and recycled organic materials from the agri-food industry in 2021**  
(in wet tonnes)

	Total	Disposal			Recycling				2021 recycling rate	2018 recycling rate	2018 quantities recycled	2018-2021 variation in recycled quantities	
		Landfill	Incineration	Total disposed	Animal feed and rendering	Composting	Anaerobic digestion	Landspreading					Total recycled
Agri-food sludge and organic materials	1,141,000		1,000	1,000	928,000	6,000	138,000	69,000	1,140,000	100%	97%	1,210,000	-6%

In 2021, nearly 1.2 million tonnes of OM in the agri-food industry was recycled, a relatively stable quantity compared to 2018.

Quantities of generated sludge and agri-food waste presented in this section are potentially underestimated as some facilities did not take part in RECYC-QUÉBEC's survey for 2021. This could explain the higher recycling rate, as the estimated 100% seems overestimated.

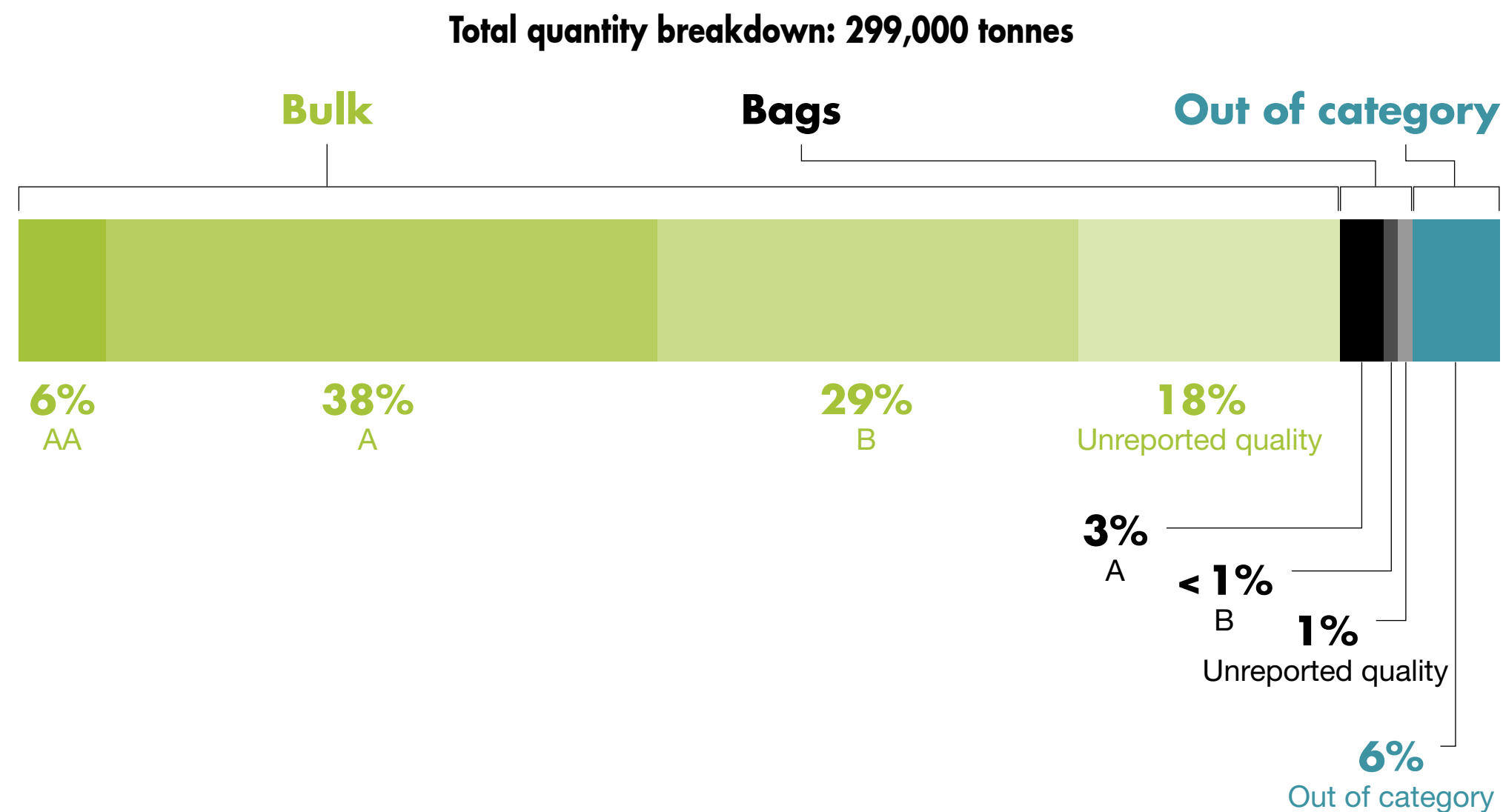
### Quality and markets for composts and digestates

In 2021, the quantity of compost produced and put on the market is estimated at 299,000 tonnes, a 39% increase over 2018.

According to reports made by composting sites, composts of a quality meeting category AA and A requirements of the compost quality standard (CAN/BNQ 413-200/2016) account for 47% of all composts produced, while 29% of composts meet the requirements for category B. The quality level was not identified for 18% of composts produced in the compost site reports.

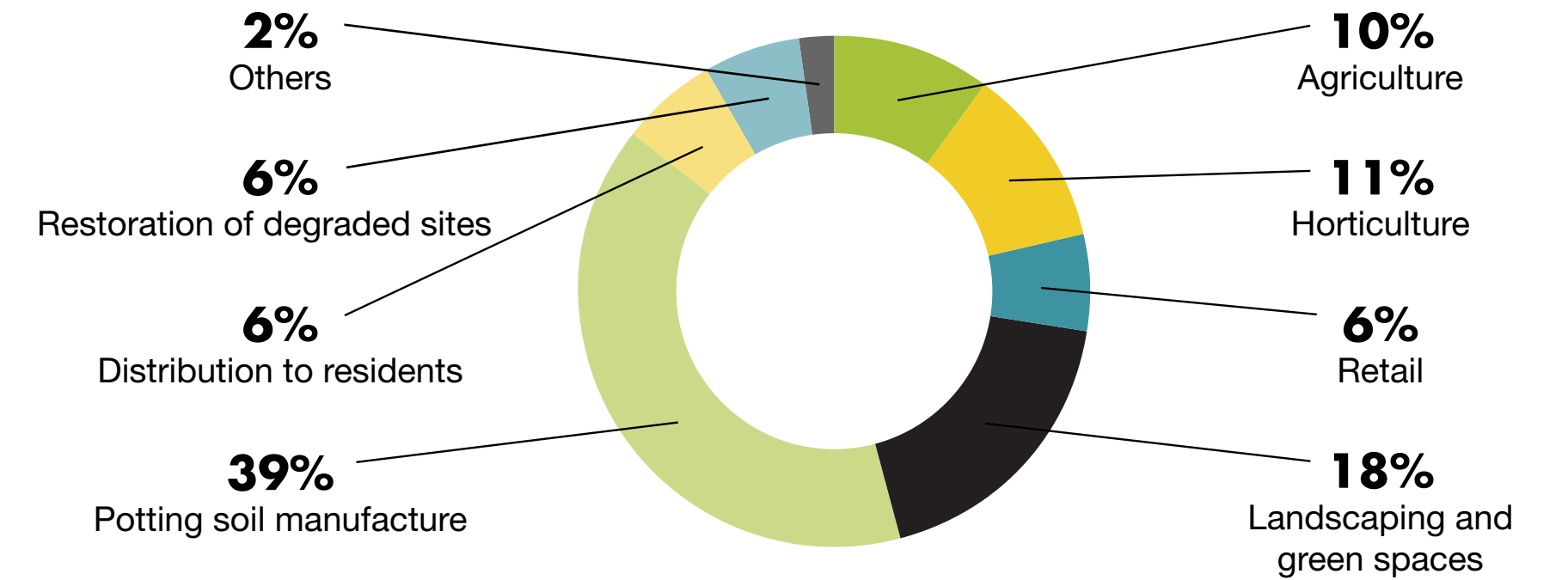
Although the quality of 6% of composts cleared out in 2021 is below the CAN/BNQ 0413-200/2016 quality standard, specific markets can still recycle them (e.g., used to restore degraded sites).

**Figure 4  
Types of compost produced in Quebec in 2021 based on quality categories<sup>4</sup>**



<sup>4</sup> Quality reports based on requirements of BNQ 0413-200/2016 standard.

**Figure 5  
Markets for compost produced in Quebec in 2021**



For their part, digestates generated in 2021 account for an estimated 66,000 tonnes, which is a 267% increase over 2018. Most of these digestates (98%) were landspread on farmland and 2% were sent to potting soil manufacture. All these digestates satisfy the quality criteria of the ***Guide sur le recyclage des matières résiduelles fertilisantes*** (French only) (guidelines for the use of fertilizing residuals for the restoration of plant cover).

**Figure 6  
Markets for digestates produced in Quebec in 2021**

