FEAD
European Waste Management Association

**08 April 2022, Brussels**

# FEAD Feedback to separate collection of municipal waste: citizen involvement and behavioural aspects (sub-group 3)

The **Joint Research Centre**, the European Commission's in-house science and technology service, is currently conducting, on behalf of DG Environment, a study on the separate collection of municipal waste.

The main scope of the working sub-group 3 is to analyse the behavioural factors that affect citizens' SWC and understand the potential of specific policy options to enhance their behaviour on SWC.

The role of the external experts is to:

- provide feedback on our findings from the literature review (e.g. whether anything is missing).
- help to identify relevant factors that affect behavioural aspects of citizens' participation to separate waste collection, as well as their relative importance.
- support the evaluation of specific policy interventions aimed at raising citizen engagement, as well as providing available information and data;
- provide an answer or supporting documents to the questions raised in the sections

**FEAD**, the European Waste Management Association, representing the private waste and resource management industry across Europe, **welcomes the objective to improve the performance of waste management systems in the EU, in particular to achieve high quality recycling, which is essential for a circular society.**

To improve recycling performance and obtain an optimisation of waste collection, **the combination of positive public support, balanced costs for citizens, and private investments is key driver for the design of waste management policies.**

Below, FEAD give its feedback to contribute to the main scope of the working sub-group 3.

## Factors affecting behavioural aspects

Most critical factors are highlighted in green.

| Category | Factors | Description | Reference |
|---|---|---|---|
| Motivation | Perceived moral obligation = personal moral norms | An individual's judgement of moral rightness to carry out one certain behaviour | (Xu et al., 2017b) (Wang et al., 2020) (Knickmeyer, 2020) |

| | | | |
|---|---|---|---|
| | | | (Zwe, 2019) |
| | Attitude = environmental concern | Towards being environmental-friendly | (Xu et al., 2017b)<br>(Fan et al., 2019)<br>(Wang et al., 2020)<br>(Knickmeyer, 2020)<br>(Miafodzyeva et al., 2013)<br>(G. De Feo et al., 2019)<br>(Minelgaitė & Liobikienė, 2019)<br>(Zwe, 2019) |
| | Subjective norm = social norm | The perception of social pressure in the decision-making process | (Xu et al., 2017b)<br>(Fan et al., 2019)<br>(Wang et al., 2020)<br>(Knickmeyer, 2020)<br>(Zwe, 2019) |

| **Category** | **Factors** | **Description** | **Reference** |
|---|---|---|---|
| | Perceived behavioural control | Refers to whether an individual feels he or she owns skills and abilities to perform the specific behaviour. | (Wang et al., 2020) |
| | Community identity | Community identity influences participation and hence determines the recycling behaviour | (Miafodzyeva et al., 2013) |
| | Perceived costs and benefits = Perceived financial costs | Refers to individual's perception on the profits of recycling and possible costs and reductions of recylcing | (Fan et al., 2019)<br>(Knickmeyer, 2020)<br>(Miafodzyeva et al., 2013) |
| | Willingness to pay for waste management services | | (Knickmeyer, 2020)<br>(Bernad-Beltrán et al., 2014)<br>(Zwe, 2019) |

| | | | |
|---|---|---|---|
| | Awareness of consequences | Refers to individual's perception of the adverse consequences for valued objects when not performing a pro-environmental behaviour | (Fan et al., 2019) |
| | Perceived policy effectiveness =system trust and community | Perception of whether the separation policy can successfully achieve the goals of reclamation and reduction | (Fan et al., 2019)<br>(Knickmeyer, 2020)<br>(Miafodzyeva et al., 2013)<br>(Zwe, 2019) |
| | Customer satisfaction | Evaluate the quality of separate collection and the service | (Giovanni De Feo et al., 2017)<br>(Zwe, 2019) |
| Behavioural Intention | Intention | Willingness to SWC (as the main aspect contributing to intention) | (Fan et al., 2019)<br>(Bernad-Beltrán et al., 2014) |
| Habitual factors | Habit = Past behaviour | The same course of action is likely to be repeated when outcomes are generally satisfactory. | (Fan et al., 2019)<br>(Xu et al., 2017b)<br>(Knickmeyer, 2020)<br>(Zwe, 2019) |
| Behaviour | Actual behaviour | Whether people engage in separate waste collection for different types of waste | (Miafodzyeva et al., 2013)<br>(Giovanni De Feo et al., 2017) |

| **Category** | **Factors** | **Description** | **Reference** |
|---|---|---|---|
| Psychological factors | Perceived convenience and effort (some authors differentiate between inside and outside) | -Short distance and strategic location of collection points for recyclables<br>-Ease of access and availability of bins<br>-Appropriate storage space at the household<br>-Availability of curb-side collection<br>-High frequency of collection<br>-Clean appearance of the recycling site<br>-Smart visual design of collection points (colour, shape, capacity) | (Knickmeyer, 2020)<br>(Miafodzyeva et al., 2013)<br>(Minelgaitė & Liobikienė, 2019)<br>(Zwe, 2019) |
| Contextual Factors | Availability of infrastructure conditions | | (Fan et al., 2019)<br>(Xu et al., 2017a) |

| | | | |
|---|---|---|---|
| | Basic knowledge of waste management or skills needed to correctly separate waste | | (Fan et al., 2019) (Wang et al., 2020) (Knickmeyer, 2020) (Miafodzyeva et al., 2013) (Minelgaitė & Liobikienė, 2019) (Zwe, 2019) |
| | Demographic characteristic = social demographic factors | Age, education level, gender, occupation, income, dwelling size, family size, household type, marital status, social class, immigration background, population density, political allegiance, religious identity, ethnicity, … | (Bernad-Beltrán et al., 2014) (Giovanni De Feo et al., 2017) (Knickmeyer, 2020) (Miafodzyeva et al., 2013) (Minelgaitė & Liobikienė, 2019) (Xu et al., 2017b, 2017a) (Zwe, 2019) |

**QUESTIONS:**

1. **According to your expertise, which factors would you flag as most critical?**

   It depends very much on the individual, their priorities and the local conditions. The more environmentally aware individuals are motivated by environmental factors and the more mature citizens are motivated by social responsibility. Some are habitual in their actions. Some react to media coverage, particularly with regard to ocean plastics and climate action. For the rest of the population, incentivised charging structures provide a good incentive to reduce and segregate waste. The key for us is to move waste management up the agenda of people's lives, so financial rewards are important in that context. Perceived convenience and effort is also very important for all citizens.

2. **Would you have any information and/or data** (based on real experiments applied in your organisations) **to share on how these factors affect waste sorting behaviour** (participation rate, efficiency of sorting, purity rate of the waste collected, …)**?**

   Incentivised charging in Ireland has led to low levels of household waste generated per capita c.330kg per capita versus EU average of c.420kg per capita. Avoidable waste such as garden waste is generated in lower quantities in Ireland as people are incentivised to home compost.

   This is particularly noticeable in the Dun Laoghaire Rathdown (DLR) borough of Dublin, where charging is comprised of a low service charge plus a per lift and a per kg charge for each bin. The historical EPA National Waste Reports provide a breakdown of waste collected in each county/municipality. The 2012 report shows that DLR produced 322 kg per capita of household waste, whereas Fingal in North Dublin produced 350kg per capita household waste that year. In Fingal, the waste companies charged a service fee and a per lift charge for the residual waste bin and lifted the organic and dry recyclable bins for free. The recycling rate was higher in Fingal, but so was the waste generation figure, so it suggests that large quantities of garden waste was presented in Fingal, but much less in DLR. The data can be further analysed here:

## Appendix B – Household waste collected and brought

| Local authority | Mixed/residual collection (black bins) (t) | Mixed dry recyclables collection (green bin) (t) | Organics collection (brown bins) (t) | Segregated glass collection (t) | Bring banks (t) | Civic amenity sites[91] (t) | Household waste delivered directly to landfill face by householders (t) | Total collected and brought household waste (t) |
|---|---|---|---|---|---|---|---|---|
| Dublin City | 84,170 | 28,956 | 15,164 | 33 | 11,531 | 3,036 | 0 | 142,889 |
| Dun Laoghaire-Rathdown | 32,110 | 19,907 | 3,834 | 81 | 1,696 | 8,824 | 0 | 66,453 |
| Fingal | 44,181 | 19,907 | 19,594 | 51 | 4,740 | 7,421 | 0 | 95,849 |
| South Dublin | 37,299 | 19,331 | 6,199 | 69 | 4,954 | 13,753 | 0 | 81,604 |
| Meath | 38,587 | 8,486 | 119 | 0 | 1,924 | 3,286 | 0 | 52,403 |
| Louth | 25,808 | 6,520 | 1,921 | 3 | 2,001 | 9,471 | 0 | 45,723 |
| Kildare | 41,560 | 13,722 | 5,963 | 124 | 3,153 | 3,883 | 0 | 68,404 |
| Wicklow | 24,411 | 5,771 | 109 | 250 | 1,911 | 4,053 | 0 | 36,506 |
| Laois | 12,549 | 3,441 | 942 | 4 | 1,138 | 1,491 | 3,087 | 22,652 |
| Offaly | 11,301 | 2,810 | 333 | 0 | 1,017 | 1,894 | 0 | 17,355 |
| Longford | 5,659 | 1,655 | 338 | 0 | 663 | 1,275 | 0 | 9,591 |
| Westmeath | 13,513 | 3,860 | 176 | 0 | 1,364 | 3,734 | 0 | 22,647 |
| **Eastern and Midlands Region** | **371,148** | **134,366** | **54,691** | **615** | **36,092** | **62,156** | **3,087** | **662,075** |

91 Includes WEEE collected by compliance schemes at civic amenity sites.

The full report is available here: https://www.epa.ie/publications/monitoring--assessment/waste/national-waste-statistics/national-waste-report-2012.php

## Policy intervention measures and awareness raising actions

| Policy intervention measures | Factors |
|---|---|
| Harmonised **separate collection** of all standard waste fractions and **commingling** rules for dry recyclables | Perceived costs and benefits = Perceived convenience and financial costs |
| | Subjective norm |
| | Perceived policy effectiveness =system trust and community |
| | Customer satisfaction |
| | Intention = willingness |
| | Perceived convenience and effort |
| | Availability of Infrastructure conditions |
| | Habit = past behaviour |
| | Behaviour |
| Harmonised **pictograms** (and/or **bin colours**) for standard waste-fractions, taking into account the link to **product labelling** | Perceived behavioural control |
| | Perceived policy effectiveness =system trust and community |
| | Perceived convenience and effort |
| | Basic knowledge on waste management or skills |
| **(Online) information systems** | Perceived moral obligation = personal moral norms |
| | Attitude = environmental concern |
| | Perceived behavioural control |
| | Community identity |
| | Perceived costs and benefits = Perceived convenience and financial costs |
| | Awareness of consequence |
| | Perceived policy effectiveness =system trust and community |
| | Intention = willingness |
| | Basic knowledge on waste management or skills |
| **Economic instruments (PAYT, DRS, positive incentives)** | Perceived costs and benefits = Perceived convenience and financial costs |
| | Household willingness to pay for the waste management services |

| | |
|---|---|
| | Intention = willingness |
| | Behaviour |
| | Availability of Infrastructure conditions |

**QUESTIONS**:

3. **Are there any other relevant factors, from the list presented in Table 1 that in your opinion can be affected by the policy intervention measures? Would you be able to classify the influence of each policy intervention on those factors (high/medium/low)?**

   In the following, FEAD analyses all the Policy intervention measures, with a focus on some specific examples that some of our members have provided us.

   **Harmonised separate collection of all standard waste fractions and commingling rules for dry recyclables** works well in Ireland as the MRFs are designed to handle the materials that are collected, including co-mingled dry recyclables. It also works well for citizens as there is consistency and convenience with the current 3-bins system (biowaste, mixed dry recyclables and residual waste) supported by bottle banks, textile banks and civic amenity sites. The system can perform better if greater financial incentivization for good behaviour is provided and weighing every customer's bin to do more in that regard.

   However, this system would not necessarily work as well if it was transferred to another country where citizens have different habits and the MRFs are designed for a different mix of materials. Likewise, a system that works well in one country would not necessarily work well in another one.

   **Harmonised pictograms for standard waste-fractions, taking into account the link to product labelling** is likely to be quite effective and is more transferable across State boundaries. It would take time to develop, but is certainly worth considering. Harmonised bin colours across the EU are a much more difficult option, as there are major inconsistencies within countries as well as across the Union. Changing bin colours would have major financial and environmental costs and would generate a lot of unnecessary plastic waste. Moreover, the re-education of people towards new colours would take a long time, as consumers are used to the colour scheme of their host country. Having harmonised bin colour would be useful for tourists, but the share of waste generated by tourist is fairly low and not sufficient to make the case for bin colours. Standardising symbols is a much better environmental option as a lot less waste would be produced.

   **Information systems** are of prime importance and necessary for public education, but citizens must firstly be interested in their waste management before they will engage with such systems to find out how best to manage their waste.

   The need for detailed knowledge about proper waste separation is high. Most Germans, for examples, know at least basic information about waste separation - however, more than half of the respondents of a survey would like to have more detailed knowledge[1]. More knowledge about correct waste separation should be spread among the population by the local administration. When throwing away waste, it is often too inconvenient to consult the internet to find out about correct waste separation, so educational leaflets on proper waste separation at regular intervals must be provided by competent authorities.

   Moreover, providing data to citizens on their own waste management performance in the context of their peers and environmental targets, has a lot of merit, particularly if there is a reward for improved performance. Most people would take an interest in their performance if it

[1] https://www.muelltrennung-wirkt.de/wp-content/uploads/2021/02/Duale-Systeme_Factsheet_BUS_Umfrage.pdf

was measured and presented directly to them. It would move waste management higher up in their priorities.

**Economic instruments (PAYT, DRS, positive incentives)** are very important to engage the public positively and to reward them for doing the right thing. **DRS** (Deposit Refund System) can be a good complement only in specific situations (e.g., portable batteries), but they risk competing against door-to-door systems and duplicate investments, especially the currently proposed "return to retail" model. This system generates unnecessary carbon emissions, is inconvenient for consumers, and lacks futureproofing. the IWMA commissioned a study[2] to examine the carbon emission impact of operating a 'return to retail' DRS for PET bottles and aluminum cans versus a Digital DRS for the same materials using the existing recycling bins. A digital DRS performs better and has several advantages:

- Lower carbon impact
- More convenient for the public, as they use their own recycling bins
- Could include a wider range of materials (HDPE bottles, steel cans, cartons, …)
- Lower costs (up to one third of the "return to retail" model)

In any case FEAD suggests not to impose a harmonised DRS digital system, but competent authorities to be invited to conduct a Life Cycle Assessment to evaluate the digital system and its efficiency both for citizens and for professionals.

**Pay-As-You-Throw (PAYT)** schemes are used by local authorities in Belgium, the Netherlands and Luxembourg in an effort to increase recycling and reduce residual waste collected from households. There are numerous different methods of applying PAYT schemes, with the part of the fee related to the choice / behaviour of residents linked either to:

- The size of container chosen by the household
- The frequency of collection of a given container
- The application of a fee per bag used
- The weight of waste set out for collection; or
- A combination of the above

Studies[3] into the various PAYT schemes have found that the schemes have resulted in a reduction of overall waste generated, and in particular lower rates of residual waste disposed of. However, not all schemes perform in the same way, and their impact depends also on the scheme that was in place prior to the implementation of PAYT. Schemes based solely on bin capacity do not bring about the same level of benefits as those based on weight or frequency of collection.

4. **How can citizen's behaviour be positively influenced by specific policy interventions? Do you have examples of municipalities implementing a measure similar to those policy interventions and how consumers reacted to it (focus on the quantitative effect on collected waste – i.e., increased volume, better quality …)?**

The door-to-door collection system has shown to increase the participation of users in sorting and collecting solid waste. In particular, the subsequent increase of collected recyclable waste has appeared to reduce its environmental impact.

Citizens practising separate waste collection using a door-to-door system were more aware of the recycling process and more satisfied with the system, as a result of the effectiveness of the information campaigns that have been locally implemented. However, if municipal authorities did not provide appropriate schemes and programmes to facilitate waste collection operations, the correct involvement of citizens in recycling was shown to be very low.

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[2] http://iwma.ie/wp-content/uploads/2021/05/210505-501.181.9_SLR-SmartDRS_CarbonStudy_BriefingNote-for-IWMA_Final.pdf

[3] Dijkgraaf and Gradus, 2003; Hogg, 2002, Hill et al., 2002

## Harmonised separate collection of all standard waste fractions and commingling rules for dry recyclables

**QUESTIONS**:

5. **How does commingling influence consumers' convenience/ability to separate waste?**
   Positively in most cases, as it is convenient for citizens to place a mix of dry recyclables in one bin. However, they must be educated, as some dry recyclable materials such as wood, glass and textiles are not acceptable in those bins and must be brought to bring banks or CA sites.

## Harmonised pictograms (and/or bin colours) for standard waste-fractions, taking into account the link to product labelling

**QUESTIONS**:

6. **Should the harmonisation of bin colours be applied at EU level based on your expertise?**
   Harmonised bin colours across the EU should not be applied. Changing bin colours would have major financial and environmental costs and would generate a lot of unnecessary plastic waste. Moreover, the re-education of people changing their habits would damage the benefit of past efforts, and would require an enormous amount of time, effort, and resources, and could possibly even lead to greater misunderstanding amongst the population. This long-term effect must not be underestimated. Private waste management companies invariably promote new habits, changing the way they work to improve source segregation and selective collection. Therefore, they are very familiar with the challenges of trying to improve citizen behaviour. If the goal is to improve separate collection systems in the EU, particularly for households, it would be beneficial to avoid confusing the population by changing waste colour codes (e.g. bins, bags, containers) for "harmonisation" purposes. In addition, the harmonisation of colour codes has no significance nor added value to the environment but will instead generate widespread confusion and substantial costs. Having harmonised bin colour would be useful for tourists, but the share of waste generated by tourist is fairly low and not sufficient to make the case for bin colours.

7. **How can the introduction of EU-wide harmonised pictograms on available bins influence citizen behaviour? How do you expect this intervention to affect the effectiveness of separate waste collection?**
   It could have a positive impact, particularly if linked to symbols on products/packaging. This intervention could help to create a unified system, especially for producers of products and package and could be an effective and cheap tool to harmonise the waste collection without disrupting local habits.

8. **Which intervention would increase separate waste collection rates and increase citizens' participation: harmonisation of bin colours or harmonised pictograms for standard waste fractions?**
   Harmonised pictograms would be most effective. Harmonised bin colours would require re-education of a large portion of the population and would have a negative impact for many years before any positive impact is achieved.

9. **How can in your opinion the introduction of matching labels on products increase the effectiveness of pictograms placed on the bins?**
   This could be very effective as most citizens are not waste management experts and cannot differentiate between different plastic polymers and cannot tell a complex laminate from a pure polymer, for example. It is also useful where some dry recyclable material such as glass, wood,

textiles, etc are not accepted in co-mingled mixed dry recycling bins.

## Online information systems

**QUESTIONS**:

10. **How should sorting instructions be delivered to the citizen according to your opinion for achieving the highest efficiency on citizen awareness** (e.g. on-line, linked with the labelling of the product - e.g., QR code -, physically in leaflet, via awareness campaigns in media, etc.)?

    All of the above. Also, direct contact through text messages, emails, etc, particularly where the customer's recycling performance is measured by the service provider and can be relayed to the householder directly with an incentive to increase recycling and to reduce waste generation.

11. **Which aspects of the following shall be included in an (online) information system to increase citizen engagement in separate waste collection?**
    a. Information about the (local/regional) waste management infrastructure
    b. Waste streams separately collected
    c. Fate of the separately collected waste (including short information about their final treatment)
    d. Any other

    _____
    _____

12. **In your opinion, how can the implementation of information systems improve the quality of recycling (focus on the quantitative effect on collected waste)? Do you have any empirical data and/or best practices you could share?**

    Providing data electronically to citizens on their own waste management performance in the context of their peers and environmental targets, has a lot of merit, particularly if there is a reward for improved performance. Most people would take an interest in their performance if it was measured and presented directly to them. It would move waste management higher up in their priorities.

## Economic instruments (PAYT, DRS, Positive incentives)

Several studies describe PAYT as an effective tool to enhance separate collection and to reduce the amount of residual waste. (Compagnoni, 2020; Huang, 2021; Rizzo et al., n.d.; Slučiaková, 2021)

Countries with DRS consistently achieve significantly higher separate collection rates for single-use beverage packaging (94%) than those who rely exclusively on separate collection via door-to-door or bring collection (47%). (Eunomia, 2020; Schneider et al., 2011)

**QUESTIONS**:

13. **What is in your view on the role of negative/positive incentives in the willingness of citizen to participate to separate waste collection? Do you have any empirical data you could share?**

    The role of incentives can be very important in the willingness to participate to separate waste collection. Only a minority of citizens are self-motivated in that regard, so positive/negative incentives can be very effective in achieving behavioural change.

    For example, Ireland has PAYT system in place and household residual waste per capita is one of the lowest in the EU. See Table 5.5 of this report for more detail:

http://iwma.ie/wp-content/uploads/2020/01/Likely-Impact-of-DRS-on-Irish-Waste-Management_Final-Report_Jan2020.pdf

Ireland has a range of incentivised charging systems in place that range from pay by weight to pay per volume to weight bands and fair usage policies. Some offerings are more incentivised than others and we believe that the more incentivised offerings result in lower waste generation and higher recycling rates, but we have not seen a study on this. Such a study is possible as the waste companies weigh every bin that is lifted, but we are unaware of any reports covering this. However, there is some detail available from the Price Monitoring Group on the different price plans offered to householders by waste companies in Ireland here:

https://www.gov.ie/en/publication/3254c-price-monitoring-group-monthly-analysis-2020/

Note that household waste collection is fully privatised in Ireland.

However, this system would not necessarily work as well if it was transferred to another country where citizens have different habits.

## Criteria for harmonised sorting instructions

- Give clear and actionable guidance to consumers on how to correctly dispose/sort waste.
- Easy to be used.
- Flexible enough to be adopted in all EU MS (interoperability between countries) considering waste management infrastructures.
- Completely harmonise labels.
- Focus on symbols, not on language or colour instructions (in case colours are not also harmonized). If language and colours included, available in different multipurpose designs (e.g. black-and-white vs. colour).
- Prevent accumulations of different logos: exclude labels and symbols for national instructions (e.g., the Triman logo, Tidyman, etc.), exclude the Green Dot (EPR scheme), consider excluding alphanumerical codes when not needed.
- Space-conscious on-pack so as to avoid increasing packaging size.
- Applicable to primary and secondary packaging (not tertiary).
- Include all actors in the value chain (manufacturers, waste management operators, municipalities, and consumers).
- Match a product identification symbol put on pack by manufacturers with symbols put on waste bags/bins by waste management operators/municipalities.
- Make synergies between on-pack sorting instructions and by digital means (e.g. trough QR codes, barcode, digital watermarks).
- Consider the special case of Ireland (situation for UK that is out of EU) - Materials placed on the market on the island of Ireland are generally supplied for the whole island, despite the fact that Northern Ireland is part of the UK and the Republic of Ireland is independent and part of the EU, so the ideal scenario would see cooperation between the EU and the UK on labelling.

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