foodpath

Report on the design of consumer focused food waste prevention interventions in Ireland

TASK WP3

VERSION FINAL REPORT

Authors and contributors:

Eileen Mitchell[1]; Keelin Tobin[2], Alberto Longo[1], Colum Gibson[2], Eileen O'Leary[2], Elizabeth Nelson[1], Sarah O'Connor[2]

Affiliations

1. Queen's University, Belfast
2. The Clean Technology Centre, Munster Technological University, Cork.

MTU Ollscoil Teicneolaíochta na Mumhan Munster Technological University · CLEAN TECHNOLOGY CENTRE CTC · QUEEN'S UNIVERSITY BELFAST · southern waste region · eastern-midlands waste region · connacht-ulster waste region · epaResearch Climate - Water - Sustainability Identifying pressures • Informing Policy • Developing Solutions

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1.1 Background

In Ireland, we generate significant levels of food waste every year, with consequent environmental, financial, and ethical implications. Most recent EPA estimates state that Ireland generated 770,000 tonnes of food waste in 2020 with 31% of this total emanating from households[1]. Previous EPA studies have shown that over 60% of household organic waste ends up in the residual bin or recycling bins (where it leads to contamination of potentially recyclable material which then cannot be recovered in a more circular economy[5]).

Food waste has a large environmental impact with the carbon footprint for food waste in Ireland being as high as 3.6 million tonnes of carbon dioxide equivalent[2]. These carbon dioxide emissions - associated with the manufacture, storage, distribution, and disposal of avoidable household food waste - is equivalent to the emissions of one in five cars on the road. In fact, globally it is estimated that food waste generates about 8% to 10% of global greenhouse gas emissions which is very close to the estimated emissions[3] for global transportation.

In addition to these significant environmental impacts, there is a financial cost to the waste. Across Ireland, it is estimated that food waste costs the average household €60 per month[4]. At a time when inflation is rising and food poverty growing, reducing food waste is an action that we all need to take.

Nationally, Ireland has set food waste reduction targets. These will help the country apply its overarching policy on waste management and enable Ireland to live within its environmental limits. The Government's Climate Action Plan and Waste Action Plan for a Circular Economy include food waste as a priority waste stream, and articulate a 50% reduction, reflecting the EU Circular Economy Package and the UN Sustainable Development Goal 12.3 which pledges to:

"By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains".

Ireland's recently published National Food Waste Prevention Roadmap 2023-2025 has more specifically identified key priority actions for the achievement of these targets.

The better management of food waste after it has been produced is an area where significant work has already been done, for example, with the roll out of brown bins across the country. However, preventing food waste must be prioritised, and any unavoidable food waste should be treated in the most resource efficient way possible. Motivating people to reduce food waste is acknowledged as being very difficult[6]. Based on the international best practices identified in WP1 and the practical expertise provided from the stakeholders interviewed during WP2, the project team identified two food waste prevention interventions for behaviour change in Ireland.

1. https://www.epa.ie/publications/monitoring--assessment/waste/national-waste-statistics/national-waste-statistics-summary-report-for-2019.php
2. "Consumption - CSO - Central Statistics Office." https://www.cso.ie/en/releasesandpublications/ep/p-sdg12/irelandsunsdgs-goal12responsibleconsumptionandproduction2021/consumption/. Accessed 24 Mar. 2023.
3. Food waste | Environmental Protection Agency (epa.ie)
4. https://www.epa.ie/our-services/monitoring--assessment/waste/national-waste-statistics/food/
5. gov.ie - Government publishes new climate law which commits Ireland to net-zero carbon emissions by 2050 (www.gov.ie)
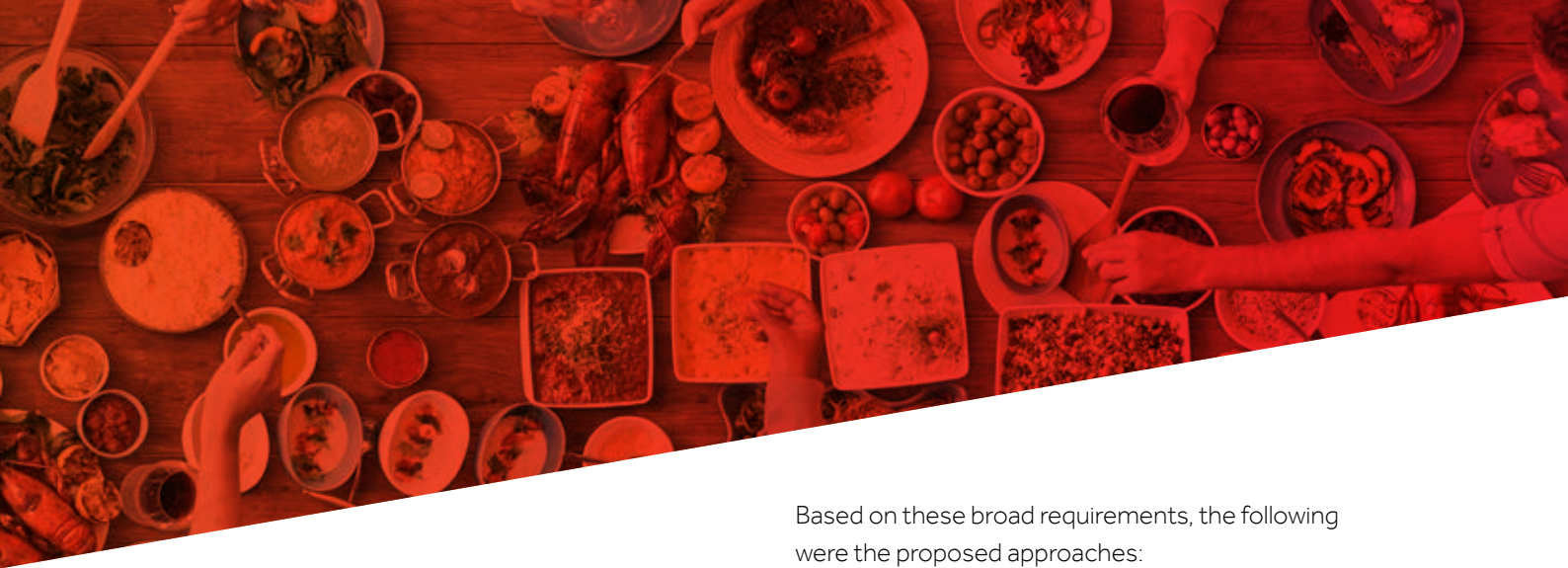
This report explains the process by which these interventions were devised and developed. We know from the literature that wasting food is not a "carefree" action – people already feel regret/negative emotions and it is not planned or conscious behaviour. Consequently, information campaigns alone are not effective at stimulating mass scale change in this regard. Understanding household behaviours, attitudes, and patterns around food waste is an important starting point as it can help ensure that more intensive and widespread food waste prevention programmes are effective in delivering real and lasting change as we move into a reduced carbon and circular economy.

To test this, employing behaviour change methods, two interventions were designed which aimed to examine the use of behavioural change feedback and nudge prompts to improve food waste outcomes.

The work in WP1 and WP2 established that elements of best practice in household or consumer level food waste interventions include:
• A clear definition of food waste
• A basis in established theory
• Use of design thinking and logic mapping
• A detailed plan for evaluation

Based on these broad requirements, the following were the proposed approaches:

Intervention A
This behaviour change intervention was designed to empower individuals to prevent and reduce food waste at the household level through tools, nudges and targeted messaging via their local waste collector.

Intervention B
This behaviour change intervention targeted social norms through community engagement via local stakeholders to prevent and reduce food waste at the household level.

Considering the established nature of the national Stop Food Waste programme, and the understanding that a scalable approach is required to transmit the messages that underpin the programme to a wider audience, the two interventions aimed to explore how this could best be achieved through availing of local infrastructure and support services. ie. the local waste contractor in the case of Intervention A and the local community in the case of Intervention B. A cost benefit assessment of both approaches will be carried out subsequent to the research.

[6] Household Waste Statistics for Ireland." 31 May. 2022, https://www.epa.ie/our-servicesmonitoring--assessment/waste/national-waste-statistics/household/. Accessed 24 Mar. 2023.

2. Research Design & Methods

2.1 Research objectives

The main objective of the research is to test the real-world effectiveness, practical feasibility, and cost-efficiency of using consumer-focused food waste prevention interventions in Ireland.

A number of the main factors considered in the design of the interventions include:

Target Audience

Work conducted in WP1 and WP2 found that interventions should have a clear target audience. There was agreement across the interviewed group that interventions should, where possible, focus on the most wasteful segment of society. Most experts mentioned "young wasters"- young people, young families or single person households as the groups generating high levels of food waste and they should be the target demographics for interventions:

"These people are at the beginning of their food journey and may lack the skills…"

Younger people may have poorer kitchen skills and less knowledge of how to prepare food or use up leftovers. Supporting this demographic in improving food skills can have co-benefits of improvements to overall diet and health. As such, the interventions were designed to target the most wasteful segments of society.

A second target demographic are the cohort of the population who are neither committed to food waste prevention nor very disinterested - the "mushy middle" or middle 60% of the population. It was agreed that any intervention messaging should resonate with the target audience and should be chosen with their relevant barriers and motivations in mind. In addition, it should be focused, attractive and clear.

"…make it really accessible. Really simple, down to earth, normal family meals that even you can get the kids involved in…"

Social Norms

The design of the interventions took social norms into account on the basis that people tend to be more motivated to do something if other people are doing it, with the focus on the positive behaviour or attitude.

Intervention Delivery

In terms of the delivery of the intervention, the stakeholders interviewed in WP2 noted that the person, or group seen to be delivering the intervention is important, since several interviewees noted that interventions linked to community engagement, peer to peer interactions worked best. They noted, in particular, that individuals tend to respond better to messages around behaviour change when the message comes directly from a peer or somebody with a similar background to them:

"I think one of the most powerful things about what I do is that I'm so like other people. When they see me doing it they go: "Oh, I could try that".

This especially informed the development of Intervention B, a community approach.

Continuity
Respondents conveyed that during past successful campaigns, the positive impact of the intervention was diminished once the organisation withdrew from the community and individuals were no longer able to refer back to the support network:

"…what we found after often was that people were really energetic, enthusiastic, and wanted to make changes, but they really needed support afterwards."

Holistic
Participants reported that there was a need for a holistic or system-based approach (one that considers the wider food environment) with regard to food waste intervention designs:

"People seem more willing to make the connection between things like plastic pollution and climate change […] we've got to square that circle and make them really realise what the impact is."

"I think we need not […] bring it back down to just the individual. Some of the systems and structures need to change, so governments are coming in and saying this needs to happen and this needs to change."

Covid
Regarding delivering food waste intervention programmes during the Covid pandemic and associated restrictions, interview participants noted that they had to re-think and adapt their current approaches, with many having to conduct workshops and training online:

"…online engagement can provide flexibility to incorporate multiple learning styles. Online workshops worked well as they fitted better into people's busy schedules. Online classes are also typically cheaper to run than face-to-face enrolment…"

Covid was a factor in the delivery of both interventions A and B.

While it would have been desirable to address all of these factors in the design of interventions to be trialled, there were also some practical factors taken into consideration including: time allocated, budgetary constraints, accessibility to suitable partners and the communities available.

Behavioural Intervention Methods

Following on from WP1 and WP2, and meetings of the project team and the steering committee, it was agreed that the design and piloting of two interventions in two separate locations would be sufficient. Taking the learnings previously outlined, two behaviour change interventions were developed to be applied in a specific town, city district, or rural region. The different study areas were chosen based on criteria determined by the research team and informed by a series of variables such as area size, likely waste data availability, access to pre-existing active community groups, amenable waste collectors, small brown bin collection service (this was an important determinant as larger brown bins are often used to manage garden wastes as well as evidenced by the results of the 2018 National Waste Characterisation Campaign). The potential effects of cultural, geographic and socio-economic variables across the study areas were also considered.

Therefore, Intervention A set out to inform food waste habits at a household level, whilst Intervention B set out to influence food waste habits at a community level. The purpose of piloting these two interventions was to make comparisons between their effectiveness, with a view to informing future work towards meeting our SDG targets.

3.1 Intervention A – At Household Level
The development of this intervention method was based on previous findings from:

Review of Best Practise for Interventions to Reduce Consumer Food Waste,
Review of Relevant Consumer Behaviour Change Studies and Initiatives,
Preventing Household Food Waste.

The design of this intervention aligns with findings of another recent Irish study, The Food Waste Recycling Project 2018-2020 which recommended that every waste collector in Ireland develop a communications campaign for householders on why and how to separate waste[7]. The design is also based on discussions with stakeholders who have a range of previous experiences with food waste intervention trials, amongst the project team, and with guidance from the steering committee.

After careful consideration and examination of the literature, it was decided that this intervention would focus primarily on individual household habits and target communication through direct contact with householders in a specific location (i.e. the confines of their own home), using a behavioural nudge tool in the form of a 'food kit' or 'food waste pack' as the intervention. Direct interaction with individual households through a food waste pack is based on previous work in Ontario by Van Der Werf et al. (2020). The food waste pack developed for Intervention A has been designed to offer practical information and tips on how households can reduce their food waste in such a way that they would feel part of a collective action (taken by households on their street), together with prompts to action. Further details of the items and messaging in this pack are explained in the following section. Additionally, to gather demographic data, as well as understand more about household food waste habits in the designated area, a questionnaire survey has been developed to support this intervention. The full survey is available in the appendix.

The success of this approach is contingent on the goodwill and support of the waste collector. It is intended that the local Regional Waste management office will facilitate the initial approach and, subsequent to an online meeting with the Head of Administration and the General Manager of the waste company, their participation in this intervention will be confirmed. Once involved, the areas where their assistance will be needed include:

- Input on the design and feasibility of the intervention
- Identification of a suitable waste collection route
- Distribution of the food waste packs
- Communications with the intervention group via text/email
- Sharing of datasets for the waste collected on the bin route
- Sharing of waste samples from the route

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[7] https://www.mywaste.ie/report-on-the-food-waste-recycling-pilot-project/. Accessed 9 August. 2023.

Figure 1: Overview of the design of Intervention A
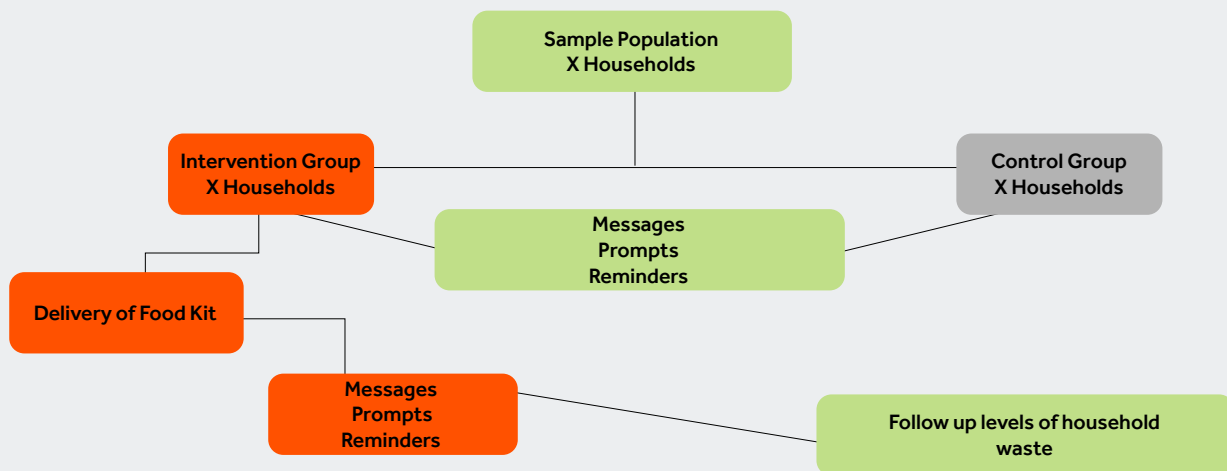
Based on initial discussions with the waste collector, an intervention period of 16 weeks was agreed, where a randomised control trial will be conducted to prevent food waste and monitor actual food waste reduction in households in Ennis, Co. Clare, Ireland. In order to test the methodology, two areas in Ennis will be randomly assigned as an intervention group and control group. In tandem with the local waste collector, it will be arranged that the pack will be sent out to a set number of households on one of their collection routes. Households in the intervention group will be sent the food waste pack providing tools and information on how households can use those tools to reduce their food waste. This will target individual behaviours within the home, with a focus on actions that relate to food already in the house (though good planning and shopping techniques will also be promoted).

To assess the effectiveness of this intervention mode, and to ensure the robustness of the results, a control group for intervention A will also be monitored. It is deemed necessary that the associated control group be of a similar number of households (and a similar demographic mix) to the intervention group. Therefore, a single waste collection route will be identified and then divided equally into a control group (that will not be sent a food waste pack) and the intervention group who will receive the pack and associated communications.

Figure 1. outlines the process of the intervention. It is important to note that the waste collection route chosen will be a well established route comprising a mix of social classes. A mature route will be chosen to try and ensure that there isn't a high turnover of households before, during and after the intervention period. This will provide more confidence in the data comparisons when assessing the data collated. The generation of food waste (from both the brown bin and general waste bin) will be the main method by which the effectiveness of the intervention will be assessed.

In the creation of the food waste pack, it was noted that targeted behaviours should be presented as life-enhancing, rather than an additional task or responsibility for an already busy population and that target behaviours could be framed to help save time or money, to improve the freshness of food, to be easy or tasty. The contents of the pack are intentionally attractive but not overwhelming or wasteful, practical action and skill-based, accompanied by prompts/commitments. Working with a graphic designer to create suitable materials, the overall message of 'make the most of the food you have' underpins the campaign, while more specific targeted messages to communicate to the target group via the waste company have also been developed. The messaging contained in the communications has been devised with social influence in mind so that the recipients of the packs and associated communications will feel connected to other people in the same area (along the same waste collection route) working towards a common goal. The text messages to be sent by the waste company were devised as reminders, prompts to take specific actions on food waste prevention. Wording of the text messages can be found in Appendix 1.

3.1.1. The Food Waste Pack

Following research, discussion, and a review of what potential items could be sourced within the budget and timeline of the study, there was agreement on the final contents of the pack:

3.1.1.1. A thermometer (suitable for fridge and freezer)

This item is deemed a practical item given that the fridge temperature is a critical factor in how long food will keep and the variability that exists in fridge temperature dials which people do not always understand. The item could be used for both the fridge and freezer. The messaging associated with this item includes a recommendation to pass it on to someone else if there isn't a need for it in the household in question, or when finished with it.

3.1.1.2. Silicon lids/covers

These covers can be used to cover opened/cut food items (such as a half an onion/apple/lemon/avocado, opened yoghurt, tin of beans, etc). These items were selected because they offer a 'second life' to commonly discarded products that have been opened but not fully consumed. They are durable and reusable.

3.1.1.3. Printed freezer labels

Given the propensity to put food in the freezer and forget about it, these labels encourage recipients of the pack to get into the practice of dating and labelling food going into the freezer so that it is recognisable when frozen and thus can be used effectively.

Figure 1 Image of the food waste pack

3.1.1.4. Food Waste Pocket Guide publication

This guide, produced by the national Stop Food Waste programme, contains extensive information for householders, presented in a friendly tone.

3.1.1.5. A fridge magnet with shopping list attached

Another item produced under the EPA Stop Food Waste Programme, this introduces householders to the national food waste programme aimed at householders and encourages the behaviour of using a shopping list.

3.1.1.6. Scoop measure

This 100 ml scoop is useful to measure out specific portions. It can be used for items such as rice or oats. It is helpful in preventing the preparation of excess.

The food waste pack was put together in a recyclable brown cardboard box which is similar to the ecommerce boxes that householders will be familiar with, echoing the sentiment of Paul Van Der Werf. In his expert interview describing the Ontario food waste pack intervention, he stated:

…it was very important for me to not put it just in a Manila envelope and get it mixed in with the rest of the mail. I wanted something… I wanted it to look like a present. So, here's this little box waiting for you.

Figure 2 Image of the leaflet to be included in the food waste pack

3.2 Intervention B – At Community Level

The development of this intervention was based on previous findings from:

- Review of Best Practise for Interventions to Reduce Consumer Food Waste,
- Review of Relevant Consumer Behaviour Change Studies and Initiatives,
- Preventing Household Food Waste.

The design was also based on discussions with stakeholders who have a range of previous experiences with food waste intervention trials, amongst the project team, and with guidance from the steering committee. As the research within WP1 & WP2 showed that community engagement, peer to peer interactions and those which involved a social element were effective, a community approach was also deemed a suitable intervention option to be designed and trialled. Thus, Intervention B will take a community approach, applying the process of co-design in a locality to understand and overcome the shared issues around household level food waste in a specific small town in Ireland. The aim with this intervention method is to facilitate local people to gain an understanding of the problem of food waste in their area and to come up with solutions collectively to prevent and reduce their household food waste, putting these ideas into practice to find out what impact can be made. With this method local ownership and an overall sustainability of the intervention is central. Therefore the initial design of this intervention is not too prescriptive, in order to facilitate these core aims.

In order to compare Intervention A and Intervention B, Irish towns of comparative size have been selected. It was necessary to choose areas where the local authority and a local waste contractor would agree to participate in the research. For Intervention B, Skibbereen in Co. Cork was chosen as the intervention location. Skibbereen was selected in part on foot of an earlier approach from members of the community who were animated around the topic of food waste.

Based on this initial approach, a scoping exercise will first be carried out to find suitable community based organisations to partner with. Once this is carried out, the next step will be mapping all relevant stakeholders, approaching them, and key individuals in the locality. Miro software will be used to facilitate this process. Communication will be made at an early stage with the Environmental Awareness Officer for Cork County Council to assess which waste contractors operate locally.

Next, an initial facilitated co-design workshop will be prepared and advertised. The core objective of this will be to facilitate the community to create an intervention plan for food waste prevention and reduction at the household level with support from the FoodPath team. Members of the local community will be invited to participate in the workshop where support and resources available will be highlighted. A trained facilitator will guide the process and a graphic harvester will be on hand to capture the discussion and agreement. As part of the intervention co-design, the group will be invited to plan a calendar of events and activities, dovetailing with existing local organisations and actions while putting an emphasis on food waste prevention and reduction. The premise of this community led approach is that it aims to target multiple points of contact through different communication and interaction channels. Therefore local stakeholders who are empowered and actively involved are integral to the circulation of information via existing networks which may include newsletters, social media, podcasts and word of mouth. It was intended that this approach will result in changed community wide values through social influence and aim to support and emphasise the shared values within the community.

In the facilitation of this intervention, care must be taken not to inadvertently enforce negative food waste behaviours by highlighting how common they are. As part of Intervention B, activities will continually and consistently refer to the national Stop Food Waste programme as the main reference point.

4. Outcome Measurement

The effectiveness of the interventions will be assessed quantitatively (based on waste data) and qualitatively (based on attitudinal surveys and semi-structured interviews). The waste collectors in the respective areas will be asked to provide waste data regarding the weights of the organic waste and general waste bins they collect from households during the intervention periods. These waste data will be the main source of empirical information used to examine the efficacy of the pilot interventions in each location. Waste compositional analysis of the general waste will be used to provide information on the food waste content of the general wastes collected.

4.1. Quantitative Assessment

In order to measure the food waste volumes produced, for both Intervention trials, the following will be assessed:

- Brown bin weights
- General waste bin weights with the food waste content evaluated through waste compositional analysis

Ideally, waste collection figures for the two groups will be gathered prior to the intervention, during the intervention and after the intervention has concluded.

Prior to the intervention, a waste characterisation will be performed on the domestic municipal waste collected from the chosen route (which will include intervention and control groups) prior to the intervention. The results from this will also show what percentage of food waste is found in the general waste stream. A second waste characterisation survey will be conducted once the intervention has finished. This will evidence if there was any change in the percentage of food waste in the general waste bin following the intervention.

For Intervention A the quantities of food waste produced by households in both the intervention and control groups will be examined through assessing bin weights at three points in time:

1. A baseline of food waste volumes produced will be carried out prior to the intervention based on waste collection data shared by the waste contractor.
2. The volumes of food waste produced will be monitored during the intervention period.
3. After the conclusion of the intervention, food waste will again be examined. This will allow any improvements that were sustained in the short term to be evaluated.

These quantities will be based on the weights of the bins collected as provided by the waste collector and will consider the brown bin (food waste collection bin) and the general waste bin.

As **Intervention B** involves a less defined approach (e.g. events will take place that only impact a small subset of the overall population) that aims to change attitudes over time, the quantitative information gathered will aim to target before and after the intervention and, ideally, at the same time of the year. Should this be possible it will allow for a better comparison based on household activities (e.g. in March there will be little garden based wastes and schools are in full term).

Once collated, these data will be assessed using statistical measures to find out if there was a significant change in overall generation of food waste during the intervention period and after.

4.1.1. Food waste measurement method

The waste characterisation (or waste compositional analysis) will involve gathering two weeks of waste from general waste bins (assuming the bins are collected biweekly) and assessing a representative sample. This representative sample of waste (typically over 100 kg) will be selected in accordance with the EPA's National Waste Characterisation Methodology which is based on the coning and quartering method.

Coning and quartering is a method that is used to reduce a large sample size for measurement without creating any bias. In this case it involves gathering the full sample of waste together and separating it out into four sections, then taking one of the four sections and repeating the first step until a sample size of 100 kg is reached. This sample will then be assessed to determine the total food waste present in that representative sample.

To give the most accurate results, these will be conducted prior to when the food waste pack is distributed in Ennis and outside of the tourist season in Skibbereen.

4.2. Qualitative assessment

Reducing food waste is not a one off event - it requires changed behaviour that needs to be sustained. Such sustained behaviour change is linked to awareness of food waste. Therefore, in an effort to supplement the quantitative data, a supporting qualitative survey will be used to understand the attitudes of intervention participants, and determine if they exhibited changes in food waste habits after the intervention. Additionally, semi-structured interviews with key participants in the interventions will be conducted to understand the process employed and its impact from the perspective of purposefully selected research participants. The selection of such interviewees and the associated interview questions will be informed by the intervention process themselves but is likely to involve waste contractors involved in Intervention A and local project participants in the case of Intervention B.

4.2.1. Survey questionnaire

It is intended that a qualitative survey will be carried out before and after each intervention. Questionnaires linked to the national behaviour and attitudes survey commissioned by The EPA[8] have been designed to survey householders in Ennis and Skibbereen. Ethical approval was sought and granted from the Research Ethics Committee of the Faculty of Medicine, Health and Life Sciences at Queen's University Belfast. The survey has been developed online using Qualtrics survey software.

To assess attitudes towards household food waste in the intervention areas, the project team has developed a 7 page questionnaire in order to explore: self-reported quantities of food waste, intention to avoid food waste, personal attitudes, perceived health risks, perceived behavioural control, personal and subjective norms, knowledge of use-by dates and of food storage, household planning habits and the 'good provider identity' (this refers to a person purchasing and providing enough food to ensure that everyone in the household has a sufficient amount (Schanes, Dobernig and Gozet)). Findings from WP2 involving stakeholder consultation interviews helped in the design and development of the survey. Note that 'food waste' is defined as all foods in a household that are discarded in a waste or bio-waste bin, composted or fed to animals.

The following demographic data will be collected: gender, birth year, number of adults in household, number of children at home and education level. The survey has been developed with the aim of being completed in under 15 minutes.

A number of screening questions will first be asked to determine if respondents currently separate their food waste from other household waste streams. Then respondents will be asked to rate on a scale of 1-5 how concerned they are about the issue of food waste, with a score of 1 indicating that they are not at all concerned and 5 indicating that they are very concerned. In the survey, respondents are informed that up to 30% of waste in the average household bin consists of food[9], and then asked to determine if they believe they fall below, above, or in line with this average, with scores ranging from 1.) Above average, 2.) In line with the average, 3.) Below average. Respondents are then provided with an open-ended question and asked how they currently rate themselves on a scale of 1-100 at managing food waste, with 1 being poor and 100 being fantastic.

Respondents will also be asked to indicate for 11 different food groups the frequency of their disposal and the amount that is disposed of because these foods are spoiled or have passed their use-by date. The 11 food groups are: fruits and berries; vegetables; potatoes and potato products; pasta, rice and corn products; meat; fish; dairy products; bread and rolls; sweet and savoury bakery products; fresh convenience meals; and processed vegetable and fruit products.

Other areas of analysis included in the survey are: the intention to avoid food waste, personal attitudes, perceived health risks, perceived behavioural control, personal norms, subjective norms. Household planning habits and motivations to avoid food waste are rated on 7-point Likert scales, with higher scores corresponded to higher agreement with the statement.

For the full survey, see Appendix 2.

For Intervention B, in addition to using the survey for research purposes, it is important that the community groups in the intervention area will have access to the results for local dissemination of information in order to inform their understanding of the local situation regarding household food waste.

Figure 3 Front page of the Ennis survey and Skibbereen taking on Food Waste survey

[8] https://www.epa.ie/publications/circular-economy/resources/Food-Waste-Attitudes-&-Behaviours-2021.pdf
[9] "Food Waste in Our Homes." https://stopfoodwaste.ie/resource/food-in-our-bins. Accessed 24 Mar. 2023.

5. Evaluation of the intervention

The data available will be used to conduct a statistical analysis of the waste presented to identify if there was any change in food waste arisings as a result of the intervention in Ennis and Skibbereen. Waste composition analysis will reveal the proportion of the general waste stream that is made up of food waste.

Questionnaires will be used to assess behaviours and attitudes in relation to food waste of those engaged in the interventions and capture any change in such that can be attributed to the interventions. Semi-structured interviews with key participants will obtain feedback on the interventions and provide suggestions for improvement and further roll out of food waste interventions in Ireland in the future. A cost benefit assessment of both approaches will be carried out as part of evaluating both types of intervention.
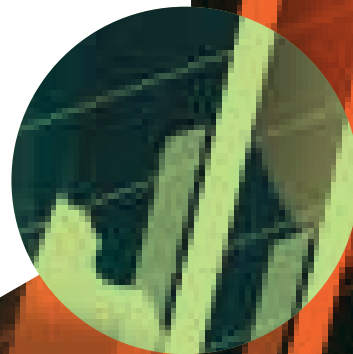
Appendix 1 Text Prompts

Fridge Thermometer text message: The temperature of your fridge should be between 0-5C (ideally 4C) to help keep your food fresh for longer. Place or hang the thermometer from the pack in your fridge. After a day or 2, if the temperature is too high or too low, adjust according to your fridge instructions.

Measuring Scoop text message: Getting proper portions for some foods like rice can be tricky. The next time you're cooking use the scoop to measure out one portion of uncooked rice so you only cook what you need.

Put a cover over it text message: Silicone covers are an easy, convenient and reusable way to help store food in your fridge. Simply pop the covers over your food and place it in the fridge until you're ready to eat it.

Label it before you freeze it text message: Freezing is a great way to make your food last but it can be easy to forget what you have frozen. Use the labels to help organise your freezer so you know exactly what is in each container and what date they were frozen.

Make a list text message: Use the fridge magnet planner to keep track of what food you need throughout the week to help plan meals and reduce the over-buying of foods you already have. This is especially important for perishable foods like dairy, veg and meat.

Learn something new text message: Have a read of the Stop Food Waste pocket guide and see if there's any new tips inside to help save you time and money.

Appendix 2 - Ennis Questionnaire

foodpath ⬡

Introduction

Be in with a chance to WIN a €100 one4all voucher by just completing this survey. In May you received a FoodKit to try to help you tackle food waste in your home. From May 18th until June 22nd you received texts giving tips on how to use each item in the kit. The following survey is to hear your opinions about the Food Kit.

The data collected from this survey will be used for statistical analysis and to inform policymakers and future research. The survey should take approx. less than 10 minutes to complete. Your participation is voluntary, and your responses will remain strictly confidential and anonymous. Thank you for your time.

Q1	Did you find that the food kit helped you during the previous 6 weeks? Yes No	
Q2	At home, do you currently separate your food waste from other household waste (e.g. with a brown kitchen caddy)? Yes No	
Q3	If yes, did you separate your food waste before receiving the kit or did the kit influence you to start separating your food waste?	
	1.Yes, I have always separated my food .	
	2. I started separating my food after receiving the kit.	
Q4	When it comes to food waste, do you think you are more concerned, less concerned or at the same level of concern since you received the food kit?	
	1. More Concerned. 2. No Change 3. Less Concerned.	
Q5	Do you think the level of food waste you throw away has lowered in the previous 6 weeks? Please select one.	
	1. Yes, by a little. 2. No. 3. I don't know.	
Q6	Up to 30% of the waste in the average household bin consists of food. Do you think you are below, above, or in line with this average?	
	1. Above average. 2. In line with the average. 3. Below average.	
Q7	How would you personally rate yourself on a scale of 1 -10 at managing food waste, with 1 being poor and 10 being fantastic?	
	0 1 2 3 4 5 6 7 8 9 10	
Q8	What types of food do you throw out in your household most often? Please rank your top four answers 1 - 3, with 1 as the most commonly wasted item.	

Bread/bakery Vegetables Fruit Meat/fish Dairy Salad Eggs	Store-cupboard dried ingredients (e.g. rice, pasta, flour, lentils, Store-cupboard canned/jar food products Frozen food Potatoes Breakfast cereals Other (please specify)

Q9	Which of these food issues most concern you? Please rank your top three answers 1 – 3, with 1 as the issue that concerns you the most.	

The cost of food Wasting food How long fresh food lasts for The way that food products are packaged Supermarkets running out of food Food product labelling (e.g. 'use by' date, storage instructions)	Food miles - the distance that food travels ingredients in food (e.g. salt, fat, sugar, additives) Food poisoning (e.g. Salmonella, E. coli) Genetically Modified (GM) foods The welfare of animals No concerns Other (please specify)

Q10	Do you do any of the following before you go shopping since receiving the kit?	
	Checked what was already in the fridge to see what I needed to buy.	
	Checked what was already in the cupboards to see what I needed to buy.	
	Checked what was already in the freezer to see what I needed to buy.	
	Made a list of the food I needed to buy. Planned most of the meals I/we wanted to cook.	

foodpath ⬡ ENNIS QUESTIONNAIRE

Q11	Which object in the food kit did you find most helpful?	
	Measuring Scoop.	
	Silicone Lids.	
	Fridge Thermometer.	
	Freezer Labels.	
	Pocket Guide.	
	Shopping List Magnet.	
Q12	Which object in the food kit did you find least helpful?	
	Measuring Scoop.	
	Silicone Lids.	
	Fridge Thermometer.	
	Freezer Labels.	
	Pocket Guide.	
	Shopping List Magnet.	
Q13	Which object(s) in the food kit will you definitely continue using?	
	Measuring Scoop.	
	Silicone Lids.	
	Fridge Thermometer.	
	Freezer Labels.	
	Pocket Guide.	
	Shopping List Magnet.	
Q14	Did you find the texts useful	
	Yes. No.	
Q15	Please indicate your gender: Male Female Non-Binary Third Gender.	
Q16	Who in your household is responsible for most of the food shopping?	
	Me.	
	Someone else.	
	Both me and other people.	
Q17	What age are you?	
	Between 25 and 34.	
	Between 35 and 44.	
	Between 45 and 54.	
	Between 55 and 64.	
	Between 65 and 74.	
	75+	
Q18	How many members of your family (including yourself) live in the same household?	
Q19	Which of the following options best describes the house in which you live?	
	Apartment Block.	
	Terrace.	
	Detached House.	
	Semi-Detached House.	
	Town House.	

Thank you again for your time and responses

If you'd like to go into the draw to win a 100 euro gift voucher enter your details below
(all information will be kept private).

Appendix 3 - Skibbereen Questionnaire

Questionnaire

Be in with a chance to WIN a €100 one4all voucher by just completing this survey. We all waste food – both at home and in businesses. Day to day it might not seem like much but when added up, food waste is a big problem. Reducing food waste is an important action we can take for both the environment and our pockets.

You are invited to take part in a survey conducted by the Clean Technology Centre at Munster Technological University Cork and Queen's University Belfast on measures to tackle food waste. The data collected from this survey will be used for statistical analysis and to inform policymakers and future research.

The survey should take approx. less than 10 minutes to complete. Your participation is voluntary, and your responses will remain strictly confidential and anonymous. Thank you for your time!

Q1.	Do you live in Skibbereen town?	
	Yes, I do.	
	No, I live outside Skibbereen.	
	No, I am just visiting.	
Q2.	At home, do you currently separate your food waste from other household waste (e.g. with a brown kitchen caddy)?	
	Yes. No.	
Q3.	When it comes to food waste, how concerned are you about it?	
	Not at all concerned.	
	Low level of concern.	
	Medium level of concern.	
	High level of concern.	
	High level of concern.	
	Very high level of concern.	
Q4.	How much food would you say that your household usually throws away each week? Please select one.	
	None at all.	
	A little.	
	A moderate amount.	
	A lot.	
	A great deal.	
Q5.	Up to 30% of the waste in the average household bin consists of food. Do you think you are below, above, or in line with this average?	
	Above average.	
	In line with the average.	
	Below average.	
Q6.	How would you personally rate yourself on a scale of 1 -10 at managing food waste, with 1 being poor and 10 being fantastic?	
	0 1 2 3 4 5 6 7 8 9 10	
Q7.	What types of food do you throw out in your household most often? Please rank your top four answers 1 - 3, with 1 as the most commonly wasted item.	

Bread/bakery ☐ Vegetables ☐ Fruit ☐ Meat/fish ☐ Dairy ☐ Salad ☐ Eggs ☐ Store-cupboard dried ingredients (e.g. rice ☐ pasta ☐ flour ☐ lentils ☐ Store-cupboard canned/jar food products ☐ Frozen food ☐ Potatoes ☐ Breakfast cereals ☐ Other (please specify)

Q8	Which of these food issues most concern you? Please rank your top three answers 1 – 3, with 1 as the issue that concerns you the most.

The cost of food ☐ Wasting food ☐ How long fresh food lasts for ☐ The way that food products are packaged ☐ Supermarkets running out of food ☐ Food product labelling (e.g. 'use by' date, storage instructions) ☐ Food miles - the distance that food travels ☐ ingredients in food (e.g. salt, fat, sugar, additives) ☐ Food poisoning (e.g. Salmonella, E. coli) ☐ Genetically Modified (GM) foods ☐ The welfare of animals ☐ No concerns ☐ Other (please specify)

Questionnaire

Be in with a chance to WIN a €100 one4all voucher by just completing this survey. We all waste food – both at home and in businesses. Day to day it might not seem like much but when added up, food waste is a big problem. Reducing food waste is an important action we can take for both the environment and our pockets.

You are invited to take part in a survey conducted by the Clean Technology Centre at Munster Technological University Cork and Queen's University Belfast on measures to tackle food waste. The data collected from this survey will be used for statistical analysis and to inform policymakers and future research.

The survey should take approx. less than 10 minutes to complete. Your participation is voluntary, and your responses will remain strictly confidential and anonymous. Thank you for your time!

Q1.	Do you live in Skibbereen town?	
	Yes, I do.	
	No, I live outside Skibbereen.	
	No, I am just visiting.	
Q2.	At home, do you currently separate your food waste from other household waste (e.g. with a brown kitchen caddy)?	
	Yes. No.	
Q3.	When it comes to food waste, how concerned are you about it?	
	Not at all concerned.	
	Low level of concern.	
	Medium level of concern.	
	High level of concern.	
	High level of concern.	
	Very high level of concern.	
Q4.	How much food would you say that your household usually throws away each week? Please select one.	
	None at all.	
	A little.	
	A moderate amount.	
	A lot.	
	A great deal.	
Q5.	Up to 30% of the waste in the average household bin consists of food. Do you think you are below, above, or in line with this average?	
	Above average.	
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Q6.	How would you personally rate yourself on a scale of 1 -10 at managing food waste, with 1 being poor and 10 being fantastic?	
	0 1 2 3 4 5 6 7 8 9 10	
Q7.	What types of food do you throw out in your household most often? Please rank your top four answers 1 - 3, with 1 as the most commonly wasted item.	

Bread/bakery ☐ Vegetables ☐ Fruit ☐ Meat/fish ☐ Dairy ☐ Salad ☐ Eggs ☐ Store-cupboard dried ingredients (e.g. rice ☐ pasta ☐ flour ☐ lentils ☐ Store-cupboard canned/jar food products ☐ Frozen food ☐ Potatoes ☐ Breakfast cereals ☐ Other (please specify)

Q8	Which of these food issues most concern you? Please rank your top three answers 1 – 3, with 1 as the issue that concerns you the most.

The cost of food ☐ Wasting food ☐ How long fresh food lasts for ☐ The way that food products are packaged ☐ Supermarkets running out of food ☐ Food product labelling (e.g. 'use by' date, storage instructions) ☐ Food miles - the distance that food travels ☐ ingredients in food (e.g. salt, fat, sugar, additives) ☐ Food poisoning (e.g. Salmonella, E. coli) ☐ Genetically Modified (GM) foods ☐ The welfare of animals ☐ No concerns ☐ Other (please specify)

Appendix 4 - Skibbereen Questionnaire post booklet

Skibbereen Questionnaire-post booklet

We all waste food – both at home and in businesses. Day to day it might not seem like much but when added up, food waste is a big problem. Reducing food waste is an important action we can take for both the environment and our pockets. You are invited to take part in a survey conducted by the Clean Technology Centre at Munster Technological University Cork and Queen's University Belfast on measures to tackle food waste. The data collected from this survey will be used for statistical analysis and to inform policymakers and future research. The survey should take less than 10 minutes to complete. Your participation is voluntary, and your responses will remain strictly confidential and anonymous.Thank you for your time.

Q1	Have you heard of the Skibbereen taking on food waste campaign?	YES NO
Q2	In your household, which best describes how the issue of food waste addressed?	
	It's not something we really think about ☐ We could probably waste less but it isn't a priority ☐ We would like to waste less but haven't done much ☐ We would like to waste less and are taking some steps ☐ It is important to us – we are always trying to minimise it ☐	
Q3	At home do you currently separate your food waste from other house waste (e.g. with a brown kitchen caddy)	YES NO
Q4	How much food would you say that your household usually throws away each week? Please select one? A great deal ☐ A lot ☐ A moderate amount ☐ A little ☐ None at all ☐	
Q5	What would motivate you to avoid food waste? Please rank your top three answers 1 - 3, with 1 as the most significant reason? (move the arrow of your selected responses up or down until you're happy with your top 3) If it saved me money ☐ If it saved my time ☐ Family expectations ☐ If it helped the environment ☐ If it's the right thing to do ☐ Friend expectations ☐ To be honest I wouldn't be motivated ☐	
Q6	What are your thoughts on Skibbereen taking on Food Waste?	
Q7	Do you have a family member who recently received a Young Chef seasonal recipes booklet at school? (if no please skip to Q13)	YES NO
Q8	Prior to receiving the recipe booklet how concerned were you about food waste? Very concerned ☐ A little concerned ☐ Moderately concerned ☐ Not concerned at all ☐	
Q9.	After receiving the recipe booklet how concerned were you about food waste? Very concerned ☐ A little concerned ☐ Moderately concerned ☐ Not concerned at all ☐	
Q10	Has receiving the recipe booklet changed your view on food waste?	YES NO
Q11	Do you think you will try some of the recipes?	YES NO
Q12	What are your thoughts on Young Chef recipes booklet?	
Q13	How important do you think it is to educate children on climate change and the importance of minding the planet? (on a scale of 1-100, 1 being not important at all, 100 being extremely important).	
Q14	Do you have any ideas about food waste that Skibbereen could consider in the future?	
Q15	What is your age range?	

Appendix 5 - Participant Information Sheet

You are being invited to take part in a research study on behalf of Queen's University Belfast and Clean Technology Centre, Cork. This interview will take approximately 20-30 minutes of your time. Before you decide whether or not to take part it is important that you understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. Please ask us if there is anything that is not clear or if you would like more information.'

1. What is the purpose of the study?
The purpose of this study is to investigate the impact, if any, of targeted interventions on households' food waste habits. The data gathered in this study may also be used to inform policy decisions and future research.

2. Why have I been chosen?
You have been chosen to receive an invitation to participate in this study because your household falls within the geographical area of [intervention area].

3. Do I have to take part?
No. It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and you will be asked to complete a consent form. If you choose to take part, you can change your mind at any time and withdraw from the study without giving a reason.

4. What will happen to me if I take part?
If you agree to take part in this study, you will receive correspondence in the post which will give you the opportunity to fill out a survey on your household's food waste habits (via a QR code linking to the [survey] website). [X time] after this, you will receive a pack of resources aimed at helping you / your family reduce the amount of food waste produced within the household. (Add what the pack will contain and the rationale behind each product?)

Approximately [X weeks] after this, you will receive another invitation to complete a survey similar to this one, outlining your household's current food waste habits. This aim of the second survey is to assess whether or not the resources you have been given were effective in reducing food waste.

Additionally, to support our investigation, we will be working with the waste collectors in Clean Ireland, who have helped us to produce a leaflet outlining how certain areas are performing in terms of food waste compared to the national average. You will receive this leaflet in your pack, and it will suggest a target for reducing food waste adapted to your household's [location].

After the interview has taken place, with your permission, we will use the data you have provided to complete a report analysing the policies discussed at interview. All responses in this study will remain anonymous; no names of individuals will be published.

5. What are the possible risks or disadvantages of taking part?
There are no potential risks or disadvantages to taking part identified.

6. What are the possible benefits of taking part?
By taking part, you may gain a better understanding of what drives food waste within your household. With this knowledge. and the tools provided in the pack, you will be able to begin considering how to best manage your resources to reduce food waste further, which will have a positive knock-on effect on both your household finances and the environment.

7. What if something goes wrong?
If you have any concerns about any aspects of the study, you can contact the chief research investigators at Cork Clean Technology Centre, Dr Colum Gibson colum.gibson@ctc-cork.ie and at Queen's University Belfast, Professor Alberto Longo at a.longo@qub.ac.uk

Should you remain unhappy and wish to make a formal complaint, you can contact the Research Governance Team at Queen's University Belfast (Telephone: 028 9097 2529; Email: researchgovernance@qub.ac.uk).

8. Will my taking part in this study be kept confidential?
Yes – your name will not be attached to any final reporting of the data given.

Your information will only be shared between the study partners at QUB and the Cork Clean Technology Centre. An agreement has been put in place for safe and confidential transfer of the study data.

9. What will happen to the results of the research?
The results of the research may be used to inform policy decisions and future research in this area.

10. Who is organising and funding the research?
The research is organised by Queen's University Belfast and the Clean Technology Centre, Cork. This project is funded by the Environmental Protection Agency, under the EPA Research Programme 2014-2020. The EPA Research Programme is a Government of Ireland initiative funded by the Department of Communications, Climate Action and Environment.

11. Who has reviewed the study?
This study has been reviewed by the QUB Faculty of Biological Sciences Research Ethics Committee.

12. Contact for Further Information
For further information, please feel free to contact:
Colum Gibson (CTC) - colum.gibson@ctc-cork.ie
Alberto Longo (QUB) – a.longo@qub.ac.uk
Keelin Tobin (CTC) – keelin.tobin@ctc-cork.ie
Eileen Mitchell (QUB) – emitchell09@qub.ac.uk
Elizabeth Gold (QUB) – egold01@qub.ac.uk

This research will be conducted in compliance with data protection legislation. For more information about how we look after your information, how to access your rights and who to contact if you have any queries or concerns about data protection please visit the Queen's University Belfast website - www.qub.ac.uk/privacynotice/Research/ListofResearchPrivacyNotices/PrivacyNoticeforResearchParticipants.
Thank you for your interest in this study and for taking the time to read through this information sheet.

foodpath

Preventing Household Food Waste

The design of consumer focused food waste prevention interventions in Ireland.