



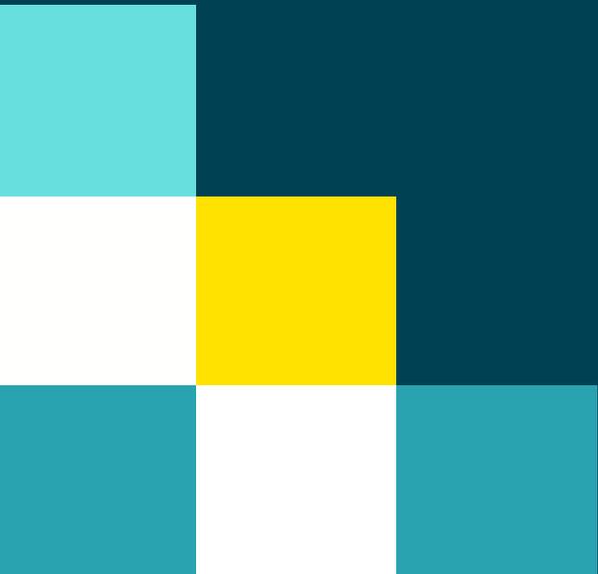
**Wales Centre for Public Policy**  
**Canolfan Polisi Cyhoeddus Cymru**

# **Behaviour change and household recycling**

**Achieving the next wave of  
improvement in Wales**

**Anna Davies**

May 2018



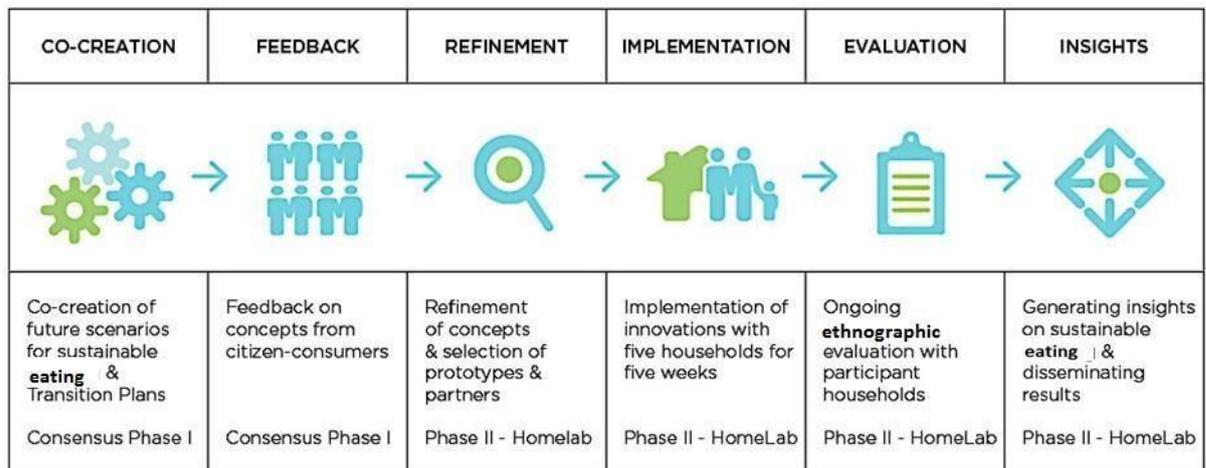
# Learning food waste recycling lessons from consensus homelabs

Wales has achieved much with regards to increasing recycling rates to become one of the world's leading nations. The low-hanging fruit has been harvested and much more challenging tasks lie ahead if momentum is to be maintained and ambitious targets met. This short paper provides summary information on a suite of behavioural change interventions that could contribute ideas which could prove useful to meeting these targets. Actions to date place Wales at the forefront of activities with regards to waste recycling. In terms of food waste specifically, there is already a comprehensive ban on landfilling food waste and mandatory, separate collection of food waste. Adhering to the food waste hierarchy, this seems unavoidable and inedible food waste recovered via anaerobic digestion, which utilises the natural degradation process to generate biogas to produce renewable energy and heat.

A combination of infrastructure (bins, collections etc.) and information provision (campaigns, information portals etc.) have facilitated the great strides made to date, but additional measures will be needed to prevent recycling rates flat lining and to move attention up the food waste hierarchy to reuse (e.g. redistribution of edible surplus for human consumption) and prevention (e.g. not creating surplus or waste in the first place). Attention to recycling will be required for residual, nonedible food waste, but this fraction of the waste stream should itself be reducing over time to ensure eating practices become more sustainable. It was with this in mind that the [CONSENSUS](#) project in Ireland (funded by the Environmental Protection Agency of Ireland) conducting a suite of co-design events focused on the practices of eating with the key question 'how do we meet our eating needs more sustainably by 2050?'. Adopting this broader framing allowed conversations about why our eating practices might lead to the creation of waste.

In CONSENSUS eating practices are understood as being performed by people in particular places and under specific circumstances — situation matters— and are shaped by a mix of internal and external rules (e.g. legislation, social norms etc.), tools (e.g. bins, collections, ICT etc.) skills and understandings (knowledge, capacities, norms etc.). The research process undertaken by the CONSENSUS research team is sketched in Figure 1. Full details of the conceptual approach, methodologies and results are available from [www.consensus.ie](http://www.consensus.ie).

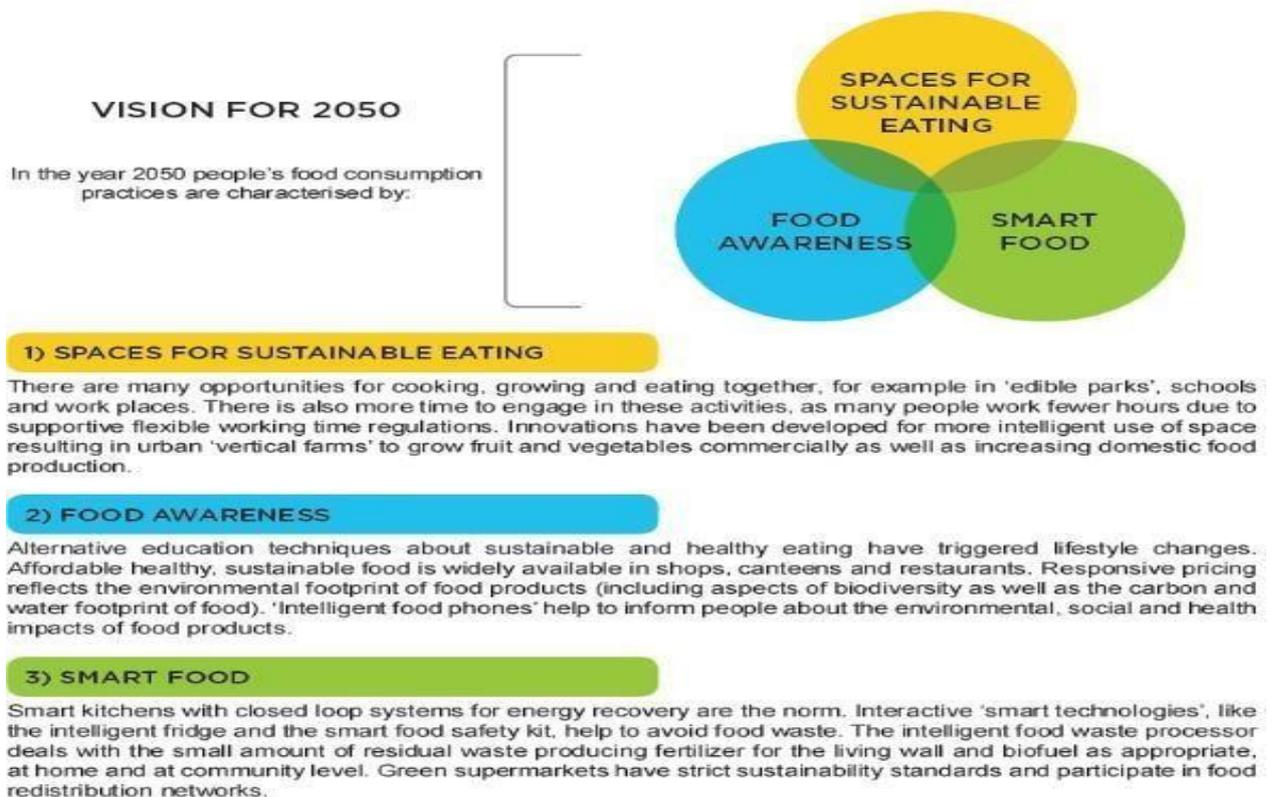
Figure 1. The CONSENSUS research process



The initial participatory visioning phases of the research generated three scenarios from which promising practices emerge and transition plans were established (see Annex 1 and 2).

Figure 2 Promising Practices

## PROMISING PRACTICES



The transition plans were used to identify short-term interventions that might build collectively towards the promising practices and the HOMELABS approach was developed to implement, test and evaluate these combined and aligned interventions.

## eating homelabs

Building on the findings of an extensive process of backcasting and scenario development, the Eating HOMELABS recruited households of different structure and circumstance to experiment with social and technical innovations, designed to facilitate more sustainable eating across practices of food acquisition, kitchen storage and preparation and food waste recovery. Tested innovations included integrated bundles of product, regulatory and educational (read norm disrupting) supports, obtained through collaboration with key societal actors and phased into households over five weeks (see Figure 3). This included, for example, experimentation with easy-to-use food growing kits, organic food boxes and the latest composting technologies, alongside carbon footprint, food safety and waste regulatory frameworks and a number of informational supports and behavioural guidelines. The impacts of the study were evaluated using ethnographic techniques.

## Selected findings

The **organisation of everyday life** is extremely important for food waste arisings. Food wastage is often the by-product of other needs, for example as a result of unpredictable work schedules, spontaneous social lives or wanting to put on an abundant spread for friends and family as a sign of care and love. Unsurprisingly, other commitments often take precedence over controlling food waste. Understanding these different logics will help better tailor policies. Of course, **lives change** so targeting practices rather than individuals is important. Periods of life stage changes, e.g. going to university, having a child, moving home, provide important access points to target particular behaviours.

**FOOD WASTE RESULTS** - Participant households reduced their overall food waste generation by **28%**. Any remaining food waste was predominantly unavoidable in nature and **100% composted**. An **average waste reduction of 3.3kg** was achieved by the end of the HOMELABS. One household increased their unavoidable food waste due to increases in the consumption of

fresh fruit and vegetables (from box scheme intervention for healthy eating). A range of findings may provide useful insight for the Welsh Government:

- **MULTIDIMENSIONAL INTERVENTIONS NEEDED - Combining and aligning** a range of **product, regulatory and educational interventions** for sustainable eating yielded positive changes in acquisition, storage, preparation and wasting practices across all household types but particular interventions worked better for some groups than others. In order for policies (and, more generally, products and services innovations) to be effective, they need to be designed with the final user in mind. Any advice that entails better planning, will generally fit more in the way of life of families with children, who are more used to planning for meals and shop accordingly.
- **HOUSEHOLD FOOD MANAGERS** - Preventing waste and managing it appropriately worked best in the HOMELABS when a single household member was in control of purchases, preparation and food management. This makes non-familial households (e.g. households comprised of multiple people such as students or private renters in shared accommodation) most challenging to address with respect to food waste reduction.
- **MOTIVATIONAL SUPPORT REQUIRED** - Consistent, **motivational support** from trusted individuals or groups was important to maintain interest and application throughout the HOMELABS. In CONSENSUS this motivation was primarily provided by a dedicated researcher and supplemented by home visits from chefs and nutritional experts as well as inspirational visits to relevant sites of innovation (e.g. community composting sites, community gardens). Alternative means of providing motivational forces that work for the householders engaged will need to be incorporated into strategies.
- **INTERVENTIONS NEED TO GO BEYOND THE HOME** - HOMELABS highlighted the ways in which eating practices take place both **inside and outside** the home, and interventions need to respond to these different sites of eating to ensure consistent messages and supports are provided (e.g. workplace food segregation facilities, school composting, meal planning supports for university students, community group triage boxes). Surveys suggest **eating out** will increase, as will **home-delivery meals**. Food waste related to these specific settings will require further attention.
- **INTERVENTIONS WILL BE AFFECTED BY CHANGES IN OTHER ACTIVITIES** - Stakeholders must consider how food waste messaging aligns with other foodrelated practices e.g. sustainable eating and food allergies, dieting, nutrition, health, convenience and safety.  
The profile of food waste will be affected by food consumption practices.
- **REGULATIONS ARE NECESSARY BUT ALONE INSUFFICIENT** – HOMELAB interventions induced differentiated impacts on eating practices according to household structures, lifestyles, pre-existing habits and individual preferences. Results highlight the need to recognise the role of social relations and micropolitics in any endeavour to shift food consumption practices onto more sustainable trajectories.
- **TRUST IS KEY** – Householders were generally willing to ‘do their bit’ provided others do likewise. Need for visible and credible indications of actions by retailers, legislators and wider society to get on board with reducing food waste and dealing with residuals in

line with the food waste hierarchy. Householders recognise the labour they undertake to recycle and are keen to know where the benefits of this labour reside.

- **SIMPLE IS OFTEN EFFECTIVE** – In the HOMELABS it was often the low-tech options that provide the most user-friendly and intuitive to use, e.g. a subdivided box (triage box) in the fridge with an ‘eat me first’ sticker proved to be an effective tool across all households and particularly where there was not an individual person who was responsible for preparing meals. Hi-tech options (envisaged in the CONSENSUS Smart Eating Scenario, for example) that help you keep track of the food you have at home (e.g. in the fridge) may reduce food waste if used appropriately, but will people habituate this new practice if the reason they produce waste food is due to hectic lifestyles, time constraints and cultures of abundance?

All interventions were kept by households unless they requested them to be removed. Box deliveries and other external food provisions ceased. Households were revisited six months and twelve months after the HOMELAB interventions and a waste audit and habit-strength survey was completed by households. Key findings include:

- ***Total food waste produced across the five households decreased***
- ***More people reported reviewing the contents of their fridges on a weekly basis***
- ***Usage rates of kitchen management devices increased***
- ***The use of storage devices to assist in identifying food close to its ‘use by’ date increased***
- ***Willingness to eat food which is past dates indicated on packaging increased***
- ***Use of the brown (organic waste) bin increased***
- ***Home composting increased (although this reduced from the peak of 100% during the HOMELABS)***
- ***The percentage of participants feeling more in control of their food waste increased***

Full details of the HOMELABS findings can be accessed from the CONSENSUS [website](#)

Figure 3 – Eating HOMELABS

	<b>HomeLab Framework</b>	<b>Week 1: Concretisation</b> Baseline data collection & establish understanding of current eating habits & practices	<b>Week 2: Acquisition</b> Connect to food production, raise awareness of environmental impact of food choices & grow your own	<b>Week 3: Storage &amp; Preparation</b> Educate about optimum storage conditions, engage in portion control, inspire new meal ideas & plan meals	<b>Week 4: Food Waste Recovery</b> Raise awareness of impacts of food waste, promote waste hierarchy, & compost unavoidable waste	<b>Week 5: Wrap-up</b> Participants continue with preferred practices & probe overall impact of Eating HomeLab
<b>Governance</b>	<b>Practice Dimension</b> Targets and guidelines set each week	No interventions	Carbon Targets	Food Safety Guidelines	Brown Bin Regulations	No interventions
<b>Tools</b>	<b>Products</b> Tools, technology and new food options that may facilitate more sustainable food shopping, cooking and disposal	No interventions	Organic Fruit and Veg Box (delivered to each home)			No interventions
<b>Education</b>	<b>Information &amp; Inspiration</b> Behavioural guidance and motivational events	Future Kitchen Visions	Food Seasonality Shopping Infographic Farmer's Market Encouragement	A-Z Storage Guide Personal Chef Visit	Food Waste Hierarchy Economics of Waste Home Composting Guides	
<b>Research</b>	<b>Research Process</b> Methods used to gather and analyse data	Habit Survey Food Waste Audit Home Visit	Facebook Page (households interact, post photos and comment, researcher posts motivational links) Diary (householders asked to keep daily diary of HomeLab experiences)			Waste Audit Ranking Feedback Grid Home Visit
			Home Visit	Eating Log Feedback Grid Home Visit	Feedback Grid Home Visit	



## WORKSHOP QUESTIONS:

### 1. How can we encourage residents to recycle as much as possible? Focusing on food

- Address prevention and reuse as well as food waste recycling e.g. portion control as well as putting food waste in the correct bin and move beyond a solely information-deficit approach  
e.g. provide portion control devices either within product design, or through social networks
- Provide appropriate supports for target practices from trusted sources
- Demonstrate good practice in government as exemplar for food waste reduction and management
- Involve people (and their practices) in co-designing appropriate supports for reducing food waste
- Roll-out segregation systems for food waste beyond the home, in workplaces, restaurants, hotels, universities, etc. consistency of services provides better chance of habituating practices

### 2. Is there an opportunity to build on the recent interest in plastics to not only increase plastics recycling but also to encourage food recycling?

- Prevention and reuse should be targeted in both cases – the very visual nature of images of plastic gyres in the oceans and scientific evidence of pervasive microplastics in water bodies has come together with resource concerns around fossil fuel basis of mainstream plastics. A longstanding coalition of forces has generated current attention to plastics, building on. Food waste also has global impacts through greenhouse gas emissions, but this is less easy to communicate visually in this way.
- There are possibilities to reduce plastic products (e.g. plates) through the use of food wastebased replacement products. A design collective in Italy who have actually made plates from food waste such as carrot peelings and peanut shells called Foodscape, see:  
<http://www.whomade.it/prodotti.php/en/foodscapes/545?lang=en>

### 3. Are there specific audiences to focus on? How do we reach them?

- **Non-familial households** were the most challenging to support in the HOMELABS research – they can include dynamic even chaotic lifestyles and eating practices, with no single food coordinator for the household. As younger households, generally without dependents, they often lead dynamic social lives and spontaneous social calendars which work against food planning and using-up leftovers. They often live in rented accommodation and can have less access to infrastructural supports and less space to develop their own. A focus on providing interventions in workplaces, eateries, educational institutions and ensuring facilities in rented accommodation are available will be important to support this cohort. CONSENSUS found that younger people tend to rely more on peers and non-mainstream media outlets to inform their worldviews e.g. social media influencers.

#### 4. What is the role for partners, who are they and how can we help them?

- Partnership is crucial not only for delivery of supports, but also for credibility amongst householders when they are asked to change their practices to recycle food waste more (and more carefully). It is important that all stakeholders from producers to regulators, as well as consumers, pitch in to assist with reducing food waste. Government bodies are extremely important but alone will be unable to provide the level of engagement required, plus already existing community groups for many. For people who are connected with social and community groups, these can provide a useful site for peer-to-peer learning and new social norm development, and as a locus for information and practice-oriented interventions to be developed, trialled and rolled-out.
- **Intermediaries** – There are a wealth of innovations around food and food waste, which are being explored by entrepreneurs and social innovators alike. For example, there are increasing numbers of grassroots community compost networks, food surplus redistribution and food waste initiatives. Many of these are increasingly using ICT (social media, websites, apps) to help connect people and scale the impact of their activities. SHARECITY, a research project funded by the European Research Council, maps such initiatives in its [SHARECITY100 Database](#) which includes initiatives like [Feedback](#) which co-ordinates Feeding the 5000 and the Gleaning Network or [Disco Soup](#)

#### 5. Which initiatives provide the best value for money?

- Best value for whose money?
- CONSENSUS found that cheap, simple low-tech technologies e.g. triage fridge box, often were the easiest to integrate into householders' practices and effective.
- Hi-tech, high-cost items, such as the electronic composter were less successful. The technologies were not optimal and also had costs with respect to electricity.
- Low-cost technologies to take the 'yuk' factor out of food recycling were also popular with those who had disposable income and were predisposed to take food recycling seriously e.g. [Obeo](#) kitchen top caddies, bin-odour and fly-reducing spray or products that either prevent or remove ethylene, a naturally-occurring hydrocarbon that triggers fruits to ripen. For example, [Bluapple](#) is a tiny device that can be kept in a home refrigerator, which absorbs ethylene to extend the time period fruit remains fresh and edible.
- Upcycling edible food waste (surplus!) - transforming what might be considered food "waste" into value-added products such as [Misfit Juicery](#) that creates juices from 70-80% recovered fruits and vegetables, and [SecondsFirst](#), which utilizes surplus produce and "under-appreciated" fish to make healthy protein-based meals. This works best for specific food waste streams e.g. coffee grounds for growing mushrooms, rather than options for householders.
- Drawing on community groups – In Ireland VOICE an environmental NGO is coordinating a body of waste ambassadors to run community [workshops](#) around the country.

# Resources

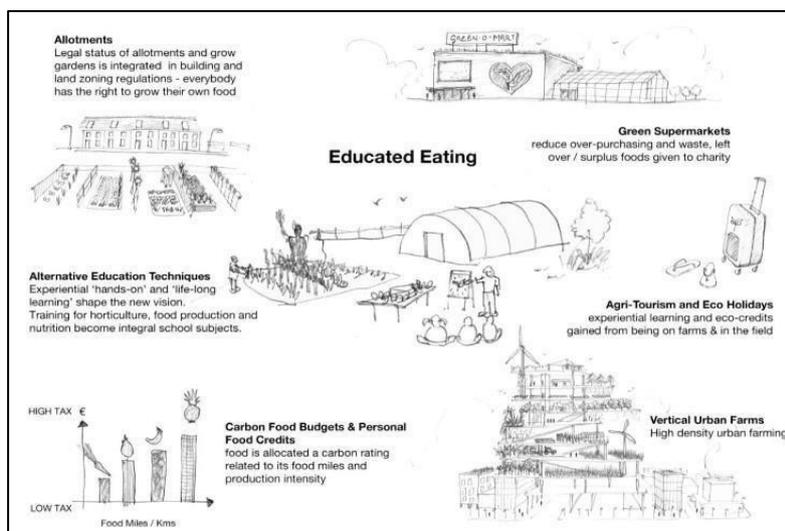
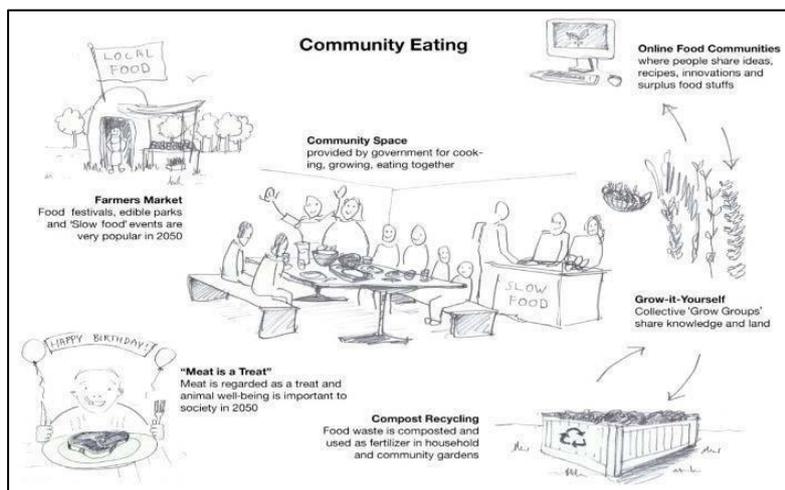
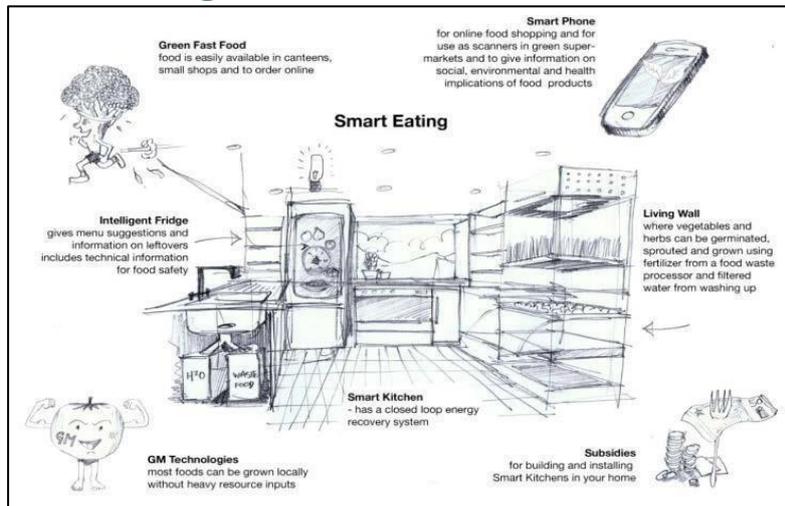
**CONSENSUS** project: Consumption, environment and sustainability: [www.consensus.ie](http://www.consensus.ie)

- Sustainable eating 2050 visions:  
<http://www.consensus.ie/wp/wpcontent/uploads/2013/11/Food-scenariosandnarratives.pdf> - Sustainable eating 2050 transition plan: -  
HOMELABs approach: <http://www.consensus.ie/wp/homelab/>
- Eating Homelabs:  
[http://www.consensus.ie/wp/wpcontent/uploads/2015/02/EatingHOMELAB\\_High-LevelFindings1.pdf](http://www.consensus.ie/wp/wpcontent/uploads/2015/02/EatingHOMELAB_High-LevelFindings1.pdf) and Longitudinal report: [http://www.consensus.ie/wp/wp-content/uploads/2013/10/EatingHomelabsFollowup\\_final\\_4\\_11\\_15.pdf](http://www.consensus.ie/wp/wp-content/uploads/2013/10/EatingHomelabsFollowup_final_4_11_15.pdf)

## **SHARECITY:**

- The practice and sustainability potential of ICT-mediated urban food sharing -  
<http://sharecity.ie/>
- SHARECITY100 Database: <http://sharecity.ie/research/sharecity100-database/>

# Annex 1: Consensus visions eating 2050



# Annex 2: Consensus eating transition framework

## TRANSITION FRAMEWORK

Towards Future Practices of Sustainable Food Consumption



	Short (2012 - 2020)	Medium (2020 - 2035)	Long (2035 - 2050)
<b>SPACES FOR SUSTAINABLE EATING</b>	<ul style="list-style-type: none"> <li>R Identify and map spaces for growing, cooking and eating</li> <li>R Research is conducted about flexible work models</li> <li>E Support community agriculture and local food markets</li> <li>E Local and national 'champions' promote sustainable food</li> <li>E Networking of sustainable food and food waste groups</li> <li>P Regulations restrict advertisements about unhealthy food</li> <li>R R&amp;D into the benefits and challenges of vertical farming</li> </ul>	<ul style="list-style-type: none"> <li>P Planning policies support communal growing and shared facilities</li> <li>P Mechanisms to encourage flexible work models are piloted</li> <li>E 'Food sharing' as a mode of exchange is piloted</li> <li>P Expand role of local authorities to designate food spaces</li> <li>E Education on food growing and cooking becomes mandatory</li> <li>R Advertising restrictions on unhealthy food are evaluated</li> <li>R Vertical farms are tested in vacant properties</li> </ul>	<ul style="list-style-type: none"> <li>P Infrastructure is provided for communal growing and eating</li> <li>P Flexible work models are mainstreamed</li> <li>E 'Food sharing' has become a societal norm</li> <li>P Food sustainability standards for buildings are mainstreamed</li> <li>E Communal food production and consumption is widespread</li> <li>R R&amp;D for closed loop food production in the home is developed</li> <li>R Vertical farms in Irish cities are operating efficiently</li> </ul>
<b>FOOD AWARENESS</b>	<ul style="list-style-type: none"> <li>R Standards for simple labelling system for sustainable food</li> <li>R R&amp;D on life cycle impacts and environmental footprints of food</li> <li>E Social marketing to generate pride in health and wellbeing</li> <li>E 'Food Dudes' healthy eating programme is expanded</li> <li>E Sustainable food education integrated in 'green schools'</li> <li>E Cooking courses provided in supermarkets by celebrity chef</li> <li>E Raise awareness of health &amp; environmental impacts of food</li> </ul>	<ul style="list-style-type: none"> <li>P Sustainable food labelling becomes mandatory</li> <li>E Life cycle analysis &amp; sustainable food standards taught in schools</li> <li>P Inter-agency collaboration between health and wellbeing bodies</li> <li>E Traditional 'healthy eating' food skills are promoted and exchanged</li> <li>P Sustainable &amp; healthy food mainstreamed in public institutions</li> <li>E More choice of (smaller) food portions is available in restaurants</li> <li>E Leftover ideas for all food products are introduced in shops</li> </ul>	<ul style="list-style-type: none"> <li>P Responsive pricing reflects env., social and health aspects of food</li> <li>R Free 'sustainable food guide' application for all smart phones</li> <li>E Education on 'wellbeing &amp; looking after yourself' in all schools</li> <li>P Choice editing: unsustainable &amp; unhealthy food is difficult to buy</li> <li>P Green public procurement of sustainable food is established</li> <li>E Restaurants engage in sustainable food provision experiments</li> </ul>
<b>SMART FOOD</b>	<ul style="list-style-type: none"> <li>R R&amp;D: development of intelligent devices in kitchens</li> <li>R R&amp;D: closed loop systems &amp; energy recovery from waste</li> <li>E Familial learning of traditional food skills is encouraged</li> <li>P Guidance on policy around food safety, risk and liability</li> <li>E Opportunities to co-create food innovations are provided</li> <li>R R&amp;D: personalised nutritional needs linked to technologies</li> <li>E Debunk the 'myth of convenience' in relation to food</li> </ul>	<ul style="list-style-type: none"> <li>E Education about interactive food-related technologies</li> <li>R Demonstrations to mainstream energy recovery from food waste</li> <li>E Social networks increase the visibility of healthy &amp; sustainable eating</li> <li>R 'Green Supermarkets' redistribute food &amp; pilot sustainability standards</li> <li>R 'Smart' shopping reduces transport emissions and saves time</li> <li>E Workshops to assist with self-build for smart food technologies</li> <li>R PPPs develop smart technologies for kitchens</li> </ul>	<ul style="list-style-type: none"> <li>P 'Smart Kitchen' energy efficiency ratings are introduced</li> <li>R Anaerobic digestion for energy recovery is mainstream</li> <li>P Sustainable food and technologies are subsidised</li> <li>R Smart phones inform about food seasonality &amp; availability</li> <li>R Sensor technology adaptable to personal preferences available</li> <li>R 'Smart Kitchens' (closed loop energy recovery) are mainstream</li> </ul>
<b>EXISTING POLICY</b>	<ul style="list-style-type: none"> <li>EU Regulation No (EU) 1169/2011 on 'the provision of food information to consumers' to come in force 2014 and 2016.</li> <li>EU Milestone 'Roadmap to a Resource Efficient Europe': disposal of edible food waste to be halved in the EU by 2020</li> <li>Irish Regulation on 'advertising of unhealthy food and drink to children' to come into force in July 2013.</li> </ul>		
<b>LEGEND</b>	<ul style="list-style-type: none"> <li>P Policy</li> <li>E Education &amp; Community</li> <li>R Research &amp; Business</li> </ul>		



# Annex 3: consensus eating homelab high level findings –

## Product interventions

***Product interventions exhibited differentiated niche appeal, highlighting the need to target, tailor and adapt devices to suit alternate household profiles and contexts.*** Different household structures evoked different meanings, benefits and uses for different Eating HOMELAB products, with significant niche appeal associated with certain items. For example, compostable food waste boxes and electronic composters particularly appealed to younger demographics that have yet to establish their own food waste recovery regimes and/or are living in particular urban or home ownership contexts that prevent them from establishing traditional composting heaps. Similarly, emphasising online meal planning techniques to demographics living out of home for the first time could initiate positive habits at that point. Products may also exhibit alternate cultural appeal, with a need to tailor different interventions to suit different international contexts. Taste preferences of different nationalities, for example, highlight the potential for geographically specific GIY kits to suit particular local environments and cultural preferences.

***Simplicity is key to achieve sustainable eating practices in households.***

Simple visual cues and easy-to-use devices proved most effective for disrupting everyday eating practices. This included, for example, the inexpensive and easily constructed fridge triage box that assisted householder with more accurate food circulation, easy-to-use compostable food waste boxes and user friendly storage devices. The minimal time and effort required to maintain sustainable eating practices using these devices held particular appeal in the HOMELAB. The role and impact of simple interventions must therefore not be underestimated alongside the potential alternate future offered by new and developing technologies (including ICT tools, aquaponics and electronic composting).

***While a zero sum game may exist regarding product interventions, the reflection induced as a result of product interactions is important.***

The running costs and footprint of some product interventions (for instance, the electronic composter) may cancel out the environmental benefits that emerge from their use (for instance, home-composting). Nevertheless, there is a need to acknowledge these interventions for their ability to prompt wider reflection and new thinking, for example,

regarding food waste management. Product interventions may also provide the initial first step for greater sustainable living, including prompting motivation to recycle all waste more effectively, as evidenced in the HOMELAB.

***Product interventions have an increased chance of success if they address all three pillars of sustainability and present environmental, economic and social benefits.***

Product interventions that address multiple eating needs and preferences exhibit a greater chance of success for wider implementation and roll-out. Products that exhibited benefits outside of environmental sustainability were particularly popular amongst HOMELAB participants (for example, the odour- and fly-reducing bin spray making a perceived unpleasant job more hygienic and appealing). Intervention tools can also hold appeal for environmental, economic and social reasons, with the fridge storage devices perceived to prevent food waste, save money and reduce feelings of personal guilt.

***Devices for sustainable eating will have minimal impact if not supported by appropriate regulatory and educational interventions.***

There is a need for sustainable product providers to support their devices with appropriate information to connect sustainable food acquisition, storage and waste recovery practices. Organic fruit and vegetable companies, for instance, could include storage guidance with their box deliveries to encourage smarter, more sustainable food storage. In addition, there is need to provide more information regarding the environmental credentials of all sustainable eating products to eradicate any consumer uncertainties regarding the environmental savings made by investing in them. Calculations could take into account the power consumption and associated carbon footprint of running such devices. Supportive regulatory frameworks that introduce mandatory carbon footprint labelling for a range of appliances would further support this initiative.

## Education interventions

***An environmentally-focused message will not be enough to change consumer behaviour with regard to sustainable eating.***

Taste, nutritional value, quality, price, convenience and food safety represented the top concerns of participants when it came to making decisions about food. Demarcations of sustainability (including environmental impact, animal welfare and organic nature) failed to feature strongly. Similarly, environmental impact was the least cited concern amongst HOMELAB participants with regard to food waste, despite wide-ranging evidence of the impact of food waste on natural resources, biodiversity loss, water stress and greenhouse

gas emissions (FAO 2013a). Instead, concerns for social inequality and economic cost predominated. Such findings suggest that environmentally-focused messaging will not be enough to change the eating practices of consumers, with a need instead to tap into other food concerns and priorities to promote the message of sustainable eating.

***Face-to face and peer information transfer were more effective than online interaction for HOMELAB participants, with opportunities also highlighted for more traditional media forms to mainstream the sustainable eating message.***

While some householders engaged in forms of online learning and meal planning in the HOMELAB (particularly the younger generations), experiential learning opportunities as well as more traditional forms of media communications were considered more impactful. Indeed, the personal and simple approach adopted in the household chef visits was particularly popular, encouraging more sustainable habits and experimentation with food. Similarly, multiple participants commented on the motivation provided by talking through issues with the researcher in the weekly house visits. Thus, rather than focusing solely on online sustainable eating tools, it is important to also promote the benefits of sustainable eating through face-to-face peer and expert learning. There is also potential for print newspapers and television advertising to communicate about sustainable eating given the perceived impact of such channels in promoting healthy eating and weight loss messages.

***The power of experiential learning that moves beyond traditional knowledge-deficit models of communication must not be underestimated in the quest for sustainable food futures.***

The power of experience and 'learning by doing' was evident in the HOMELAB, with multiple participants praising the hands-on nature of the experiment. The need for physical devices to accompany wider educational supports was necessary to create wider impact and action. In keeping with the success of combined intervention approaches, information providers should thus endeavour to supply appropriate additional tools wherever possible. For example, the Coeliac Society of Ireland or WeightWatchers International could provide portion control devices and access to meal planning tools to promote food waste reduction amongst their clients.

## **Governance interventions**

***A combination of 'sticks' and 'carrots' are necessary to achieve a sustainable food future, with significant potential also for sustainable choice editing at the retail scale.*** There were evident preferences amongst householders to achieve behaviour change through voluntary action, with permanent roles thus existing for soft regulatory measures such as government

information campaigns, recommended codes of practice and voluntary agreements. The reality of achieving this ideal future is however questionable, with previous consumer consumption patterns often requiring stricter governance frameworks to achieve necessary change (for example, the 2002 plastic bag levy in Ireland). Wider choice editing for sustainability also holds significant potential at the retail scale. Indeed, challenges of access to sustainable food options reported by HOMELAB participants could be addressed if retailers were incentivised, encouraged, or indeed required, to choice edit their stock to include more sustainable food products and alternatives.

***Improved food labelling is necessary for consumers to make informed sustainable food choices.***

The availability of sustainable food options represented a distinct concern for many Eating HOMELAB participants, both from a perspective of physical accessibility as well as knowledge regarding the impact of their food choices. There is scope therefore for policy interventions to also implement forms of sustainable food labelling across the food industry. This could include communicating about the carbon footprint of food or implementing environmentally-focused traffic light labelling (similar to that currently used to display nutritional characteristics). There is also need to streamline expiration date labels on foods, including use of the labels 'display until', 'sell by', 'best before' and 'use by'. Such categorisations must be simplified, with a need to establish their relevance to different food groups to prevent unnecessary food waste at retail and household levels.

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