HomeLabs: From scenario to intervention for more sustainable consumption

Anna Davies I Ruth Doyle I Laura Devaney
In Phase II, CONSENSUS worked with an array of actors from public, private and civil society sectors to identify existing and prototype innovations for sustainable household practices that reflected those identified in our co-created future scenarios.

Technological, regulatory and informational innovations were acquired, tested and evaluated using ethnographic processes within Irish households over an intense 5 week period.

This built understanding of the variety of washing and eating practices carried out by individuals and the kinds of strategies that can be deployed to encourage more sustainable solutions.

Insights feed into recommended actions for stakeholders who collaboratively shape washing and eating practices including policy-makers, education and NGO sectors, and commercial industries.
HOMELABS AS CHANGE LABS

City experiments - City Watch in Ireland, the Future Cities Laboratory in Singapore and Intel’s London Living Labs trialling new technologies, novel public policies and services, or social innovations within particular urban spaces.

Simulated living laboratories - co-designing and evaluating innovative products and services with users in an imitation ‘home’ setting in universities or industrial settings. MIT and their House_n initiative - explores the intersection of new technologies, materials and design on lifestyles

In-House - explore, with householders in their own homes, the impacts of and reactions to innovations, prototypes, or niche activities for more sustainable living - the LEEDR (Loughborough, UK) and the European SusLab platform are both developing solutions for reduced domestic energy consumption.
Taking everyday practices as the starting point for behaviour change

- HomeLabs builds on the growing body of research on sustainable behaviour change that notes the flaws of reductionist strategies where behaviour is considered the result of individual attitudes or values, or something that can be influenced by one intervention alone (e.g. pricing strategies).
- Instead, a practice-oriented approach takes practices rather than individuals as a starting point for behaviour change and considers the social, technical & governance forces shaping these.

![Homelabs Practice Orientation Diagram]

Everyday practices take their form based on the interaction between these 4 dimensions.

The HomeLab washing study identified tailored innovations targeting each of these dimensions.
WASHING HOME LABS

FROM SCENARIOS TO IMPLEMENTATION:
A PRELIMINARY ANALYSIS
PROBLEM ORIENTATION

Key issues for sustainable water consumption
- Water stress is likely to increase
- Poor understanding of everyday water use
- Low levels of conservation behaviour
- Development of new water governance framework – metering and charges
- Inadequate engagement of citizen-consumers
- Disconnect between users and water supply
- Escalating water use in personal washing
- Technical lock-in: water using practices shaped by existing technology & products

Promising Practices
1. **Ecologically connected**: linked with fluctuations in water availability
2. **Adaptive**: in response to a) water availability and b) actual cleanliness needs
3. **Efficient**: in their water consumption

HomeLabs prototyped & evaluated washing supports to promote these qualities with users.
## HOMELAB DESIGN OVERVIEW

<table>
<thead>
<tr>
<th>Practice Dimension</th>
<th>Homelab Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance</td>
<td></td>
</tr>
<tr>
<td>Tools</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
</tbody>
</table>
WATER USAGE

*HomeLab - average water use per person per day for personal washing*

47% DECREASE
**WASHING PRACTICE TYPOLOGY**

**Heterogeneity in washing practices**
- No one reason why people wash
- A large variance in the motivations, needs and expected results associated with different kinds of washing.

**6 key generic types of washing practice**
- Participants’ stated key motivations for washing.

**People tended to practice 1 - 3 key forms of washing**
- Each washing practice varies in frequency, time of day, water requirements & washing activities

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**STRATEGIES TO TARGET DIFFERENT WASHING PRACTICES**

<table>
<thead>
<tr>
<th>Education</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splash Wash</td>
<td>Shower head</td>
</tr>
<tr>
<td>Pause / adjust shower flow</td>
<td>Condense / Displace washing steps</td>
</tr>
<tr>
<td>Planning</td>
<td>Cues to raise consciousness</td>
</tr>
<tr>
<td><strong>Wake-Up Shower</strong></td>
<td><strong>Routine Re-Fresh</strong></td>
</tr>
<tr>
<td>Encourage morning splash wash if another shower is planned for later in the day. A splash wash can be a quick 30-second body immersion in the shower.</td>
<td>Planning to avoid a second wash later in the day. Wake up showers are typically short yet consumption rises from washing twice the same day.</td>
</tr>
<tr>
<td><strong>Intensive Grooming</strong></td>
<td><strong>Escapist Showering</strong></td>
</tr>
<tr>
<td><strong>Post-Exercise Clean</strong></td>
<td><strong>Therapeutic Bathing &amp; Showering</strong></td>
</tr>
<tr>
<td><strong>Therapeutic Bathing &amp; Showering</strong></td>
<td><strong>Wake-Up Shower</strong></td>
</tr>
<tr>
<td><strong>Routine Re-Fresh</strong></td>
<td>Encourage people to pause / reduce their shower flow during lathering, shaving and hair conditioning.</td>
</tr>
</tbody>
</table>
WATER PORTAL

Connecting with nature’ logic of Water Portal an important motivator; should be accompanied with salient information, pricing information & social feedback.

- Water Portal concept was seen as useful by participants - could be up-scaled and applied by utility companies.
- On-line basecamp where educational information is provided along with personalised consumption and billing feedback.
- Social comparisons in consumption displayed proved motivational and aided benchmarking.
- More direct citizen-consumer contact (e.g. via text / phone app alerts) could be employed when system conditions change and some suggested that variable pricing could be applied linked with peak demand and levels of water availability.
TECHNOLOGY INTERVENTIONS

Low understanding of litre consumption related to washing; opportunity to improve knowledge & for new product innovation

• Participants drastically under-estimated water consumption in their showers and were often shocked when water use was made visible by the shower water meter.
• Litre feedback proved a more potent a motivator and learning tool than the shower timer

There is untapped opportunity for educational measures and technology development to raise visibility of litre consumption. This was seen as a necessary complement to water charges to empower consumers to adjust their water use

“They should be putting litre use on everything so that you understand. Like they can’t just charge something at, at the end source and not – you know it’s such a government way of dealing with something but it’s really unfair on consumers to charge and measure out there and not measure in here, inside”.

Rosie, 33

“I knew I spent probably above the average amount of time in the shower but I didn’t realise how much water that actually is, [used] you would never think it would be that much, it’s pretty cool that it [the shower meter] tells you”.

Ruan, 18
WATER USE TARGETS

Targets for water use motivated change; potential policy application
- Participants were unaware of the quantities of water used generally including showering.
- Application of variable water targets via the Water Portal encouraged progressive reduction in water consumption and the shower meter allowed participants to act on this knowledge.

Role for policy in setting demand reduction targets?
- But on what basis and at what level?
- Seasonality, water stress, ‘average’ usage per capita, time of showers (peak time) or feasibility?

“We don’t really know how much [water] we should really use so as we went along it would definitely encourage you - for me anyway - to go lower, and to keep it lower, and to try and have a target...if you’d never given us the fifteen [litre] one, I’m sure we’d have stayed probably that bit higher, I can’t see why we’d go down because we’d think we were being good at twenty [litres]. If you said forty was good, we’d be thinking oh great, well I’ll use thirty-eight – because you’d have thought that was what the average person used”. Kerry, 49
The power of “just trying it” to disrupt practices and promote learning
- With guidance and technical supports, participants were surprised by water reductions

Planning washing activities is a key strategy to avoid over-usage of water
- Planning around exercise, hot water availability was an effective strategy to avoid twice-daily or ad hoc washing

Pausing / reducing water flow is a successful strategy for lowering water consumption
- Key means for participants (particularly those with power showers) to achieve reductions in consumption and hit low litre targets.

Societal influencers including hair-dressers, online stylist bloggers and the hair and body care industry play a role in product selection and usage

All participants reported high levels of learning and intentions to continue the behaviours, skills and technologies promoted in HomeLabs after the experiment.

Correlation between time spend and water consumption was inconsistent
- Pausing or reducing flow while lathering
- Power shower - five minute power shower could consume more than an 80 litre bath.
- Overly simplistic cues e.g. “taking a shower instead of a bath” or a timed “five-minute shower”.

Need time and litre data
SHOWER RE-DESIGN POSSIBILITIES

Create shower settings oriented around user needs
• Create variable flow rates and aeration patterns that are linked with different functions. For example: a) classic / soak (medium power); b) lather (pause); c) full rinse (high-power); d) light rinse (low / eco-setting); e) therapeutic (aerated pattern / high power)

Create ‘shower cycles’
• User selects an automatic cycle based on the shower type they’re having. E.g. someone could select a regular ‘Re-Fresh Shower’ which might start with a ‘classic’ litre flow, and transition to ‘lather’ and ultimately ‘full rinse’ settings.
• Audible / timer cues could be used to assist users in measuring progression through the cycle

Architecture of shower space:
• Positioning of shower dials to assist in adjustment, and well-insulated spaces to retain warmth if shower flow adjustment / water pausing strategies are promoted.

Real-time litre feedback on litre use (potentially using ambient lighting / sound cues)
• Integrated into future shower design – linked with litre guidelines provided from water utility companies
HAIR & BODY CARE PRODUCTS

Opportunities to reduce water use through innovation in hair and body care products
1. **Combining steps** (e.g. combined shampoo and conditioner products)
2. **Displacing steps** (e.g. moving washing steps outside the shower for example by using leave-in conditioner)
3. **Using dry / no water solutions** (e.g. body gel cleaners, dry shampoo & dry shaving).

“Definitely time-wise it is much quicker...We both loved the leave-in conditioner and it’s a really simple thing that you just don’t think about”, **Liz, 40**

“I don’t like it [low-foam shampoo] at all, it really knots up my hair!...It’s just, you have to use quite a lot, it doesn’t really spread very well”. **Anne-Marie, Household C**

“thought it was great just meant I had two less bottles to open –the important thing is like you’re just getting washed”. **Dave, 32, Household C**

“I gave myself a quick Dry Bath wash with a facecloth and actually it really made a difference because I did feel clean would be a useful product to have you know” **Kerry, 49, Household FT**
Integrated interventions relating to governance, tools and education yielded changes in washing practice.

- Participants often mentioned the linkages between these interventions, and highlighted their role in providing the motivation, learning, ability and support required to adjust their personal washing practices.
- Responses might include separate yet complementary actions; further collaborations to champion and further test innovations in different contexts.

Average reduction of 47% in water use per person per day for personal washing during the HomeLabs study.

- Amphiro meter trial = **22% reduction** in a 1 month study of 60 Swiss households (Tiefenbeck et al., 2013a).
- Willis et al., (2010) found **27% reduction** in water use (from 57 litre to 41 litre) amongst 151 households fitted with a shower monitor set to sound an alarm at 40 litres.
- HomeLabs participants reported that the utility of the Amphiro meter was greatly improved through the water use targets and benchmarking feedback provided through the Water Portal.

There are limits:
- Questioning of need to focus on personal washing.
- 10-15 litre minimum water for hair washing (with supports).
- Strong social norms.
EATING HOMELABS

FROM SCENARIOS TO IMPLEMENTATION:
A PRELIMINARY ANALYSIS
PROBLEM ORIENTATION

Key Issues for food consumption:
• Environmental impacts of food production & consumption are increasing
• Hunger and malnutrition persist worldwide while obesity is on the rise
• 30-50% of food is wasted globally
• Escalating meal expectations: meat consumption trends
• Limited visibility of the impact of everyday eating practices
• Practice lock-in: purchase, storage, preparation, cooking & wasting practices in the kitchen

Need (identified through backcasting research):
• Householders need knowledge, devices & regulation to transform their eating:
  a) Food Aware
  b) Spaces for sustainable eating
  c) Smart Food

HomeLabs prototyped & evaluated eating supports to promote these qualities with users.
# Eating HomeLab Overview

<table>
<thead>
<tr>
<th>HomeLab Framework</th>
<th>Practice Dimension</th>
<th>Week 1: Concretisation</th>
<th>Week 2: Acquisition</th>
<th>Week 3: Storage &amp; Preparation</th>
<th>Week 4: Food Waste Recovery</th>
<th>Week 5: Wrap-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rules &amp; regulations</td>
<td>Targets and guidelines set each week</td>
<td>No interventions</td>
<td>Carbon Targets</td>
<td>Food Safety Guidelines</td>
<td>Brown Bin Regulations</td>
<td>No interventions</td>
</tr>
<tr>
<td><strong>Governance</strong></td>
<td><strong>Tools</strong></td>
<td><strong>Products</strong></td>
<td><strong>Information &amp; Inspiration</strong></td>
<td><strong>Research Process</strong></td>
<td><strong>Methods used to gather and analyse data</strong></td>
<td><strong>Education</strong></td>
</tr>
<tr>
<td>Organic Fruit and Veg Box (delivered to each home)</td>
<td>Home Aquaponics Kit</td>
<td>Meal Planning Website</td>
<td>Compostable Food Waste Boxes</td>
<td>Protein 1: Organic Meats</td>
<td>Food Seasonality</td>
<td>Shopping Infographic</td>
</tr>
</tbody>
</table>
EATING HOMELAB IN ACTION....
HIGH LEVEL FINDINGS

• Implementing a range of product, regulatory and educational interventions for sustainable eating yielded changes in acquisition, storage, preparation and wasting practices across household types.

• Participant households reduced their overall food waste generation by 28%. Remaining food waste was predominantly unavoidable in nature and 100% composted.

• The Eating HomeLab revealed the need for a combination of motivating forces, information interventions and devices for optimal behavioural impacts in sustainable food consumption.

• Simplicity is key to achieve sustainable eating practices in households.
EATING TYPOLOGIES

- Targets for sustainable eating interventions
  - Scope to disrupt associated practice norms of food acquisition, storage, preparation & waste recovery for more sustainable eating.
HomeLab interventions induced differentiated impacts on eating practices according to household structures, pre-existing habits and individual preferences.

- Implemented interventions enabled householders to question, disassemble and reconfigure their eating practices onto more sustainable pathways.
- 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.
- Further, the HomeLabs approach highlighted the benefits of addressing and connecting multiple interdependent practices of eating (acquisition, storage and preparation and waste recovery) for more holistic transitions to sustainable eating.

For more information:
High level findings: [http://www.consensus.ie/wp/papers-reports/](http://www.consensus.ie/wp/papers-reports/)
Paper under review with *Journal of Consumer Culture*
For more information
Prof Anna Davies – daviesa@tcd.ie
Dr. Ruth Doyle – rdoyle4@tcd.ie
Dr. Laura Devaney – ldevaney@tcd.ie
## Morning Sustenance

<table>
<thead>
<tr>
<th>What</th>
<th>A form of on-the-go, often pre-emptive food fix, with the aim of kick-starting the day, providing energy and preventing hunger before lunch time</th>
</tr>
</thead>
<tbody>
<tr>
<td>When</td>
<td>Exclusively morning times; often variances between weekday &amp; weekend</td>
</tr>
<tr>
<td>Who</td>
<td>All householder profiles, particularly those with structured working days</td>
</tr>
<tr>
<td>Sociality</td>
<td>Generally not a household activity - mostly carried out in isolation.</td>
</tr>
</tbody>
</table>
| Key insights | **Acquisition** Pre-prepared, processed snacks or sliced bread predominate.  
**Preparation** Limited time spent preparing this meal.  
**Waste** Little food waste created but packaging of processed products creates waste. |
| **Sustainability Potential** | Morning sustenance represented a highly routinised habit for many HomeLab participants, with certain resistance and a lack of recognition obvious regarding the need to alter this practice onto more sustainable pathways. Participants instead preferred to focus change on larger meals prepared later in the day, perceived to have greater environmental impact. There is nevertheless potential to incorporate homemade breakfast snacks into this practice using left-over fruit and nuts to increase its sustainability potential (for example, using up leftover fruits when making smoothies). This could also help to reduce food and packaging waste. Such change however requires a degree of organisation (for example, to prepare breakfast the night before) and commitment to better food storage options (for instance, to freeze ripe fruit). |
## Interventions

<table>
<thead>
<tr>
<th>1. Ecologically Connected</th>
<th>2. Efficient</th>
<th>3. Adaptive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Involves <em>adjusting</em> washing habits and water use in the home in accordance with <em>fluctuations</em> in levels of water availability.</td>
<td>• Involves greater <em>awareness</em> of time and water use during washing and conscious planning of personal washing activities</td>
<td>• Involves moving away from standardised washing to <em>variable</em> strategies that better reflect:</td>
</tr>
</tbody>
</table>
| • Aims to engage citizen-consumers as co-managers of demand to reduce pressure on the environment and water services. | | a) Water availability  
b) Personal cleanliness needs |
| **How?**                  | **Online water portal** | **Point-of-use smart meters** | **Adaptive behaviours** |
| (HomeLab Interventions)   | • To communicate water availability and set associated water consumption targets for different end-uses. | • Using ambient cues to show water use and time. | • Including reduced washing, splash washing, targeted cleaning |
|                           | • Provides different washing suggestions depending on water levels. | **Efficient fixtures and products** | **Products** |
|                           | • Updated with pertinent information on water services and water use impacts | • Low-flow shower heads  
• Hair and body products that encourage lower water use in washing practices. | • Use of waterless / low-water personal and hair care products. |
<table>
<thead>
<tr>
<th>Profile</th>
<th>Couple (C) Household</th>
<th>Family (F) with young (Y) children</th>
<th>Mixed (M) Household (i.e. non-familial)</th>
<th>Family (F) with Teenagers (T)</th>
<th>Family (F) with Adults (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier^12</td>
<td>Household C</td>
<td>Household FY</td>
<td>Household M</td>
<td>Household FT</td>
<td>Household FA</td>
</tr>
<tr>
<td>Occupants</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Name &amp; Age</td>
<td>Anne-Marie 29</td>
<td>Steve 42</td>
<td>Des 35</td>
<td>Gerry 50</td>
<td>Aisling 61</td>
</tr>
<tr>
<td></td>
<td>Dave 32</td>
<td>Liz 40</td>
<td>Rosie 36</td>
<td>Kerry 49</td>
<td>James 63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emer 13</td>
<td>Mark 36</td>
<td>Ruan 18</td>
<td>Peter 25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chris 9</td>
<td>Annie 33</td>
<td>Halle 16</td>
<td>Claire 21</td>
</tr>
<tr>
<td>Home type</td>
<td>Apartment</td>
<td>Bungalow</td>
<td>Terraced flat</td>
<td>Semi-detached</td>
<td>Semi-detached</td>
</tr>
<tr>
<td>Ownership</td>
<td>Owner-occupied</td>
<td>Owner-occupied</td>
<td>Rented</td>
<td>Owner-occupied</td>
<td>Owner-occupied</td>
</tr>
<tr>
<td>Location</td>
<td>City-centre</td>
<td>Rural</td>
<td>Suburban</td>
<td>Suburban</td>
<td>Suburban</td>
</tr>
<tr>
<td>Shower flow</td>
<td>13.8 LPM (Litres Per Minute)</td>
<td>13 LPM</td>
<td>7 LPM</td>
<td>8 LPM</td>
<td>7.5 LPM</td>
</tr>
</tbody>
</table>
HOMELABS INTERVENTIONS

HomeLabs interventions in-situ

Adaptive washing
You might be surprised to hear that on average, only around 50% of people across the world wash every morning. An IKEA study showed that under 60% of people in London wash themselves in the morning. Another UK study suggested that 70% of the population wash each day. The ways we carry out our washing practices vary around the world and have changed through time. See what strategies can work for you to be as prudent with your water use as possible for the next few days.

Try This!
TWO-IN-ONE SHAMPOO & CONDITIONER
A single product to shampoo & condition your hair in one step. This might speed you up in the shower...

USE WATER LIKE YOU CATCH THE RAIN.
USE WATER LIKE YOU CARRIED IT THREE MILES.
HOMELABS DATA GATHERING

key sources:

- Initial survey
- House visits & interviews
- Whatsapp interaction
- Washing logs (recording shower time, litre use, motivations and product assessments)

<table>
<thead>
<tr>
<th>Litres</th>
<th>Minutes</th>
<th>Main reason</th>
<th>Shower adjustments</th>
<th>When?</th>
<th>Product assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tick 1-3 boxes</td>
<td></td>
<td></td>
<td>Circle emotion &amp; product</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daily clean, Wake-up, Relaxation, Hair wash, After-exercise, Quick refresh, Shaving</td>
<td>Splash wash, Stopped flow midway, Adjusted volume</td>
<td>Morning, Afternoon, Evening, Before Bed</td>
<td>Low-foam shampoo, Co-Wash</td>
</tr>
</tbody>
</table>

Washing log details (completed daily by participants)