

Summary Report

Futures Literacy Lab on Food Waste

Lisa Scordato, Per Koch and Julia Szulecka*

This policy brief summarises the main reflections and images which emerged from a Futures Literacy Laboratory (FLL) on food waste conducted on October 22nd, 2020, in Oslo. The aim of the FLL was to mobilise the collective intelligence of a diverse group of experts and people with an interest in food waste problems and to explore their different stories about the future. The FLL made use of these stories to reflect on pre-conceptions, social, economic, environmental and technological drivers, paying attention to food waste problems in Norway.

By presenting the main projections and images generated by the FLL participants, this brief presents possible futures and development scenarios for reducing food waste. Moreover, it highlights questions and issues which can help researchers, experts and policymakers explore diverse and unexpected trajectories.

This FLL was organised as part of two larger projects sponsored by the SAMANSVAR programme under the Research Council of Norway: the AFINO network and learning centre on responsible research and innovation in Norway and the BREAD project on Building Responsibility and Developing Innovative Strategies for Tackling Food Waste.

Headed by the Norwegian University of Science and Technology (NTNU), AFINO consists of a network of university and research institute partners. An important objective is to explore how research and innovation may better address future societal challenges through research and learning laboratories. AFINO organizes activities and events to promote better integration between researchers, the industry, the community and policy makers to build an understanding of responsible innovation in Norway. The Nordic Institute for Studies in Innovation, Research and Education (NIFU) is adapting UNESCO's futures literacy methodology for use in AFINO (Miller 2018).

BREAD, as one of AFINO's four satellite projects, is coordinated by the Centre for Technology, Innovation and Culture (TIK Centre) at the University of Oslo. The objective is to gather the necessary knowledge about effective and efficient solutions that the Norwegian food sector can implement in order to tackle food waste.

Food waste: a major global challenge

The alarming scale of food waste is one of the most pressing global problems. Avoiding food waste is at the heart of consumers and the food sector's societal responsibility. While the goal of reducing and avoiding the wasting of food is broadly accepted, the questions how best to do it require reflection.

The alarming scale of food waste is one of the most pressing global problems. Its current scale is catastrophic, estimates suggest that at least 30% of food grown worldwide is lost before reaching the consumer (FAO 2015; GO-Science 2011). Saving 50% of the food wastes would allow feeding more than 1.6 billion people, more than the number of undernourished people (Cross and Gasim 2018).

On top of the unquestionable ethical challenge, food waste presents a big economic loss and causes a great environmental impact. The Food and Agriculture Orga-

nisation of the United Nations (FAO) estimates a global pure economic cost of food waste as much as USD 1 trillion per year, with further environmental costs reaching around USD 700 billion and social costs USD 900 billion (FAO 2014). The energy embedded in the lost or wasted food exceeds 10% of the global energy consumption (FAO 2017). The carbon footprint of food waste is catastrophic, estimated at 3.3 billion tonnes of CO₂ equivalent of GHG annually, what could be translated into the third biggest emitting “country” after the US and China (FAO 2013).

Similarly, food waste is a significant problem in Norway. Østfoldforskning (today NORSUS) estimated that in 2017 about 385,000 tons of edible food was wasted along the value chain in Norway, corresponding to 73 kg per capita per year, with a yearly value of NOK 22 billion and emitting 1.3 million tons CO₂ equivalent (Stensgård et al. 2018).

The problems associated with food waste have increasingly capture the attention of both policy makers and academics the last 10-15 years (Närvänen et al. 2020). Today, the food waste problem is prominent in

public policy debates globally (Aschemann-Witzel et al. 2015, Närvänen et al. 2020, Papargyropoulou et al. 2014).

There is an almost universal agreement among stakeholders that wasting food is wrong—morally, economically and environmentally. Of the one hundred+ targets operationalizing the Sustainable Development Goals (SDGs), few are as clearly spelled out as Target 12.3 on food loss and waste: Policymakers globally should “by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses” (SDG 2015).

Despite the general agreement on the need to act and reduce food waste scale, the problem involves a range of different actors, institutions, consumers with diverse underlying perspectives that drive food waste reduction tools. Efficient responses to the food waste challenge can simultaneously address several “grand challenges” but also become a standard for managing future societal transitions (Närvänen et al. 2020).

Box 1: The workshop methodology

Futures literacy laboratories (FLLs) are co-created learning- by- doing processes with the objective to enable participants to reveal, reframe and rethink the assumptions they use to imagine the future. The approach is anchored in the tradition of Futures Literacy and developed within the UNESCO network on anticipation. UNESCO defines Futures Literacy (FL) as a «capability and a skill that allows people to better understand the role that the future plays in what they see and do». According to Riel Miller, head of the Futures Literacy Unit at UNESCO, «FL is important because imagining the future is what generates hope and fear, sense-making and meaning. The futures we imagine drive our expectations, disappointments and willingness to invest or to change. When only the past and the present is used to approach the future, detecting novelty becomes difficult and problematic. By consciously and deliberately expanding the ways on how to use the future, we can integrate complexity in our choices» (Miller, 2018). FLLs have been developed as a practical method aimed at developing futures literacy among stakeholders, integrating capacities for anticipation, reflexivity and inclusion in the development of projects, programmes, institutions and policies.

In the context of policymaking, futures literacy is increasingly being viewed as a crucial skill, as the exploration of alternative futures need to be part of responsible policy advice (Larsen, Mortensen, Miller, 2019). The numerous wicked policy problems, as exemplified by the United Nations SDGs and by the ongoing COVID-19 pandemic, have led policymakers to question the business-as-usual approaches (such as forecasting, expert advice and horizon scanning) supporting the preparation and planning of how to best tackle them. What makes FL distinctive is the capacity for improvisation, spontaneity and the explicit exploration and sense-making of our anticipatory assumptions. These are competences which, according to Miller, are necessary if policymakers want to address complexity. Miller emphasis that the point with FL is «to use the future to question, unpack, invent what is going on and what is doable now» (Miller, 2011, page 28).

UNESCO has established a global network of policy makers and researchers who are developing and using future literacy for similar purposes. In Norway, NIFU is part of this network through the futures literacy activities within the AFINO centre.

Organisation of the workshop

In this FLL on food waste NIFU used an adapted version of the UNESCO approach meaning for instance that it was arranged as one-day laboratory, as opposed to 2-3 days. Given the time limitations of a five- to six-hour workshop (as opposed to longer once) it was not possible to create coherent, unified scenarios from the workshop. Nevertheless, the time spent was enough to bring forward several ideas, observations and narratives about social, economic, environmental and cultural processes and to identify unexpected challenges and opportunities.

The 15 participants were selected based on their connection to the BREAD project and on their interest in and experience with food waste issues. They were researchers, practitioners, policy makers, experts and students coming from a large variety of Norwegian organisations: Matvett, the Centre for Technology, Innovation and Culture (TIK Centre) at the University of Oslo, NIFU, the Norwegian Institute for Sustainability Research (NORSUS), the Agency of Urban environment from the City of Oslo, the Research Council of Norway, Food banks Norway, "The Future in Our Hands" (a non-governmental organisation), the Norwegian University of Life Sciences, TIK Teknovatøren (a student magazine), Nofima, the Norwegian University of Science and Technology (NTNU), Consumption research Norway (SIFO).

In the workshop participants talked openly and anonymously about possible futures within the framework of food waste, in small interdisciplinary groups. In keeping with the general design principles of FLL the workshop was carried out in three main sessions, preceded by an introduction to the FLL approach and followed by a plenary debate. Each session lasted for approximately one hour each.

Session 1: Hope scenarios: the participants were asked to think about and present the future they desire/dream about, freeing themselves from the boundaries set by realism. The aim was to reveal their visions for the future, their dreams and ideals.

Session 2: Realistic scenario. The participants were asked to describe what they realistically believed would be the situation in the future. The aim was to map the participants preconceptions and mental barriers.

Session 3: Reframing scenario. The facilitators present an unexpected "counter-scenario" that forced the participants to imagine an unexpected future. The aim was to make the participants develop unexpected narratives which could help them identify possibilities

and challenges that are not normally seen in current debates. The reframing was also to help them critically approach their given understanding of the current social, political and cultural systems.

In each session the participants were divided into smaller groups of 5-6 people (including the facilitator) and asked to describe the future in 2050 on Post-its. The notes were not signed, and the descriptions anonymised. The participants were asked to bring out their own, personal reflections and not those representing their respective organisations. The descriptions were given in the form of citations, newspaper headlines, quotes, short stories, etc. The facilitator asked each of the participants to present their reflections to the other group participants which led to discussions and reflections within the groups.

The facilitators, who had followed the group discussions, brought up some critical points for debate in the final plenary session.

The facilitators took pictures and collected the notes which were used for later documentation. The participants reflections were grouped into broader categories reflecting the main thematic focus of the short reflections and images. When reading and comparing the participants images of the future the facilitators found that most of them revolved around four broad thematic areas: *i) global trends, ii) production, consumption and distribution of food, iii) habits, routines and culture, iv) and technology and innovation.* Other, but less frequent reflections dealt with issues related to education, politics, laws and regulations.

In the next part of this brief, we provide a concise summary of the main outcomes from the three sessions based on the discussions in the break-out groups.

Main outcomes

Hopes

The first session started with group discussions on the participants' hopes related to food waste in society by 2050. The main objective was to reveal their visions and dreams for the future, letting them free themselves from the boundaries of realism about what could happen.

Across the groups, participants expressed their hopes for a future without hunger, and where food waste was no longer a problem. People would have good access to food and food sharing would be a normal part of life. A stronger sense of community amongst people would make it easier to share food leftovers. Participants hoped that production would be adjusted to actual demand for food. Some hopes also reflected radi-

cal shifts in wider economic models. For instance, the following hopes were shared in one of the groups:

«We have left the idea of economic growth as the main goal. Focus on wellbeing for all.»
«We see ourselves as integrated in the ecosystem and humans are included in ecosystem models.»

In terms of food production hopes emphasised locally and community- based food production. Participants dreamt about a future where Norwegians had become self-sufficient in food production and where people were engaged in producing their own food, involved in community supported agriculture, and being active food producers in cities, reflecting a hope for a widespread system of urban agriculture. Someone radically hoped for the closure of all food shops and that all food were to be sold through cooperatives.

Hopes also revolved around using food waste and redistributing surplus food differently from today. On these notes, one participant hoped for a future where:

«Food Banks became The National Coordination Centre for Sustainable and Fair Redistribution of Surplus Food, cover the whole country and coordinate smaller units like local Food Banks, Hubs, Social Supermarkets.»

Moreover, some participants' hopes emphasised a different way of organising our working life. They hoped that in 2050 we would work less hours in order to be able to spend more time on food production and preparation and on waste free cooking.

Across the three groups participants put their hopes into new digital solutions. They hoped for more responsible use of technology in packaging and production, and technology enabling more efficient food production. Some hoped for smart solutions in kitchens, such as smart refrigerators, apps and monitoring technologies using big data. New sources of proteins would hopefully lead to less consumption of meat. The following images illustrate some of these ideas:

«The fridge is as important as the car – same status, same importance.»
«The fridges are in charge of food shopping – people decide menus, dishes, diets.»
«In 2050 all the refrigerators keep track on the food and the expiring dates.»
«Households fridges gets filled automatically according to waste out.»

Apart from smart technologies helping our households, participants dreamt about better habits and ro-

utines used in shops and restaurants which would help customers make the right choices and thereby reduce their food waste.

In the groups, participants expressed their hopes for school children being educated about sustainable food consumption and production.

«In 2050 the most important subject in schools is how to grow and take care of food.»
«Food production & waste/composting integrated systematically at all levels of school.»
«All children in school learn about healthy, tasty diets and to cook, using the best ingredients.»

Realistic expectations

In this session, facilitators underscored that there were no right or wrong answers, but that the participants should try to focus on what they really thought was probable.

Not all predicted futures were optimistic. Across the three groups, climate change was believed to still be a major global challenge affecting food production and society in 2050. Mostly participants ideas revolved around issues of food scarcity.

Some participants believed that in 2050 the world would be facing a deeper climate crisis than today. This would lead to a global food crisis spurring conflicts and the collapse of ecosystems. As a possible effect, participants believed food scarcity would cause increased migration and political turmoil. Some even mentioned the probability of global conflicts from food scarcity leading to war. In general, it was believed that food scarcity would increase food prices and make availability lower.

Still, one participant optimistically believed that the food scarcity crisis would force people to waste less food. This idea was contrasted by another scenario projecting that more food would be wasted at the farm level due to extreme weather conditions.

Participants projected that climate change would have severe impacts on the Norwegian food system and living conditions. These projections revolved on the following ideas:

«Norway is not able to grow food due to climate change. Too much rain, wind and cold ocean water.»
«Polluted oceans have affected availability of seafood. Fishing industry hit by plastics in the oceans.»
«Norwegian families spend 20% of their income on food (double than in 2020), people cannot afford to waste as much anymore.»

Some participants argued for a more positive future in which today's efforts in developing technologies and innovation in combatting food waste would have paid off. Today's voluntary "Bransjeavtale" was believed to have been institutionalised and become mandatory and that a food waste law introduced in 2030 would have a great impact on food waste reduction, both at production and consumption stage, contributing to reducing food waste from today's 80 kilos to 10 kilos per person.

Other participants had difficulty imagining that today's food waste levels would look much different in thirty years: in fact, as illustrated by a news headline imagined by a participant: «After 30 years, Norwegian people still throw away 80 kilos of food every year!»

Across the three groups participants believed that there would be smart innovative solutions which would help households reduce their food waste. Some of these (smart refrigerators, QR-codes, etc.) were also reflected in the previous session on hopes. Some of these were imagined to be smart solutions in the kitchen (smart fridges) helping people keeping track on food and waste, digital food service platforms, community kitchens, etc.

The future would also bring innovation in bioengineering bringing into the market new types of food, vegetables and meat replacements, such as cell meat.

In one of the groups the discussion revealed contrasting views on the future of processed and prefabricated meals. On one side it was believed that prefabricated meals would be part of the solution of food waste reduction, on the other it was imagined that processed food would increase food waste due to a perceived low consumer value.

The group discussions also revolved around new farming and production methods, such as urban agriculture, indoor agriculture, hydroponics, vertical farming, and big data to predict food demand.

Interestingly, we found that polarisation amongst food consumers was raised as a realistic scenario across the groups. Selected images, from the three groups illustrates this observation:

«Half of the population do not believe in food waste problems.»

«Consumers are even more polarised between those who really care about food waste (and diets) and those who want to oppose to the «moralist approach.»

«Parts of the population are positive about new types of food, while traditionalists demand their daily steak, sausages or burgers made of real meat.»

«Disagreement between political parties how they further want to reduce food waste.»

Box 2: Reframing scenario

We are in Norway AD 2050. Due to the pandemics, climate change, extreme weather events, the global food systems have been significantly changed compared to what they have looked like at beginning of the 21st century.

Food is a scarce resource, but the Norwegian government has estimated there is enough food to feed the Norwegian population. Under one condition – no food can be wasted.

If people behave as they did in 2020 and waste 1/3 of edible food, 1/3 of the Norwegian population will suffer from hunger.

Therefore, the government decided to use the Chinese model that was developed under the name of the «Clean Plate Campaign» and successfully implemented in recent decades. This model assumes limiting individual freedom and some civic liberties to achieve a higher goal – food security of the entire Norwegian population.

From now on, food waste is illegal and highly penalized.

Therefore, people are monitored with modern technologies if they consume their food at homes and in public spaces. The Ministry of Agriculture and Food received special surveillance and invigilation powers for protecting the citizens from hunger.

Restaurants are very strict in rationing food. If a person leaves uneaten food on the plate, adequate authorities are informed. Such irresponsible citizens face difficulties with getting mortgages for their apartments, sending their children to good schools, or getting promotions at work.

Each person wasting food is treated as a criminal and an 'enemy of the people'.

Reframing

In keeping with the FLL design, the third session called for a reframing exercise that uses rigorous imagining to inspire participants to imagine anticipatory assumptions that were outside the boundaries of their existing frameworks.

Participants were presented with a fictive scenario and asked to imagine society and themselves reacting to the scenario. The scenario was constructed by the facilitators without reference to probability or desirability. The main assumptions of this alternative future world (see box 2) were that the conditions for food consumption were completely altered and inflicting on individual freedoms and civic liberties.

The groups moved differently through the process. This was also the session in which we saw most conflicting arguments. One group determined that the scenario would lead to higher rates of obesity and to health-risks related to people eating bad food. Food scarcity was related to food safety. Another group determined that the population would eat healthier than today and that lifestyle related diseases would decrease.

Across the groups, it was imagined that with a limitation of peoples' liberties there would be an increase of illegal black markets for food, and food waste. The restrictions were also to have an impact on how people would organise their lives, such as having less children and living together across generations. Diets would become more seasons based. People were seen to produce their own food and more community amongst people for sharing food (as in the previous two sessions). On exploring this scenario, they saw that people would become anxious about consuming food, and that the joy of eating food would disappear.

It was imagined that the restrictions would lead to people being more imaginative and knowledgeable about how to reduce food waste and take care of leftovers. Initiative to avoid food waste would flourish. Retailers would invent new ways to preserve food and frozen food would be more popular. There would also be an increase in investments in research and technology on food and farming. On the technology side, it was imagined that the surveillance industry would experience a boom as demand for surveillance technology of food consumers would increase sharply. Interestingly, this aspect was also mentioned in the session about

realistic scenarios; big data and monitoring of consumers' eating habits becoming more common practice.

While, participants saw benefits in terms of reaching the goals of the food regime, it was clear that this situation would lead to protests and civil unrest. Part of the population would not tolerate the "Clean plate initiative" as it was interfering too deeply with citizens' fundamental liberties.

Concluding remarks

The objective of this FLL was to enable participants to reveal, reframe and rethink their anticipatory assumptions regarding the problems and consequences of food waste.

Overall, the participants clearly managed to make explicit their anticipatory assumptions about the future of food waste. They moved beyond the technology push or technology fix perspectives which are often found in other types of foresight exercises. It may be that the recent political and cultural upheavals have made people more aware of cultural and political trends, including – but not limited too – attitudes towards food consumption, environmental and societal challenges and the need for trust in the political system.

To a large extent the participants also managed to discuss possible systemic feedback loops between technology development, environmental challenges, politics, cultural values, and societal transformation. Such competences are essential when tackling unexpected shifts and complex policy problems. The exercise demonstrated that the nature and the extent of the food waste problem depends on who is asked, i.e. different stakeholders have different anticipatory assumptions of the problem and how to respond to it. Moreover, the images and stories produced by the participants revealed that the causes, the extent and the solutions to reduce food waste are not linear, but multi-causal with interconnections to many other questions.

The outcomes from this laboratory will be followed up by and used as inputs for the research activities in the BREAD project on responsible strategies for tackling food waste.

References

- Aschemann-Witzel, J., de Hooge, I., Amani, P., Bech-Larsen, T., and M. Oostindjer (2015). Consumer-related food waste: causes and potential for action. *Sustainability*, 7(6), 6457–6477.
- FAO (2013) Food wastage footprint: impacts on natural resources. Summary report. Rome: FAO. Available at: <http://www.fao.org/3/i3347e/i3347e.pdf> (accessed 2.11.2020)
- FAO (2014) Food Wastage Footprint: Full cost-accounting Final report. Rome: FAO. Available at: <http://www.fao.org/3/a-i3991e.pdf> (accessed 2.11.2020)
- FAO. (2015) Global initiative on food loss and waste reduction. Rome: FAO. Available at: <http://www.fao.org/3/a-i4068e.pdf> (accessed 2.11.2020)
- FAO (2017) The future of food and agriculture. Trends and challenges. Rome: FAO. Available at: <http://www.fao.org/3/a-i6881e.pdf> (accessed 2.11.2020)
- GO-Science. (2011). Foresight: The future of food and farming: Challenges and choices for global sustainability. Available at: http://www.eracaps.org/sites/default/files/content/foresight_report.pdf (accessed 2.11.2020)
- Larsen, N., Mortensen, K.J., and Miller, R. (2019) «What is Futures Literacy and why is it important?» On overcoming resistance to change and poverty of the imagination. <https://medium.com/copenhagen-institute-for-futures-studies/what-is-futures-literacy-and-why-is-it-important-a27f24b983d8>
- Miller, Riel (2011) Futures Literacy- Embracing Complexity and Using the Future. *ETHOS*, issue 10 October 2011.
- Miller, Riel (2018) Transforming the future. Anticipation in the 21st Century. Routledge. New York.
- Närvänen, E., Mesiranta, N., Mattila, M. and A. Heikkinen (2020) Food Waste Management. Solving the Wicked Problem. Cham: Palgrave Macmillan.
- Papargyropoulou, E., Lozano, R., K. Steinberger, J., Wright, N and Z.B. Ujang (2014). The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production*, 76, 106–115.
- Rasul, G. and B. Sharma (2016). The nexus approach to water–energy–food security: an option for adaptation to climate change. *Climate Policy*, 16(6), 682-702.
- SDG. (2015). 17 Sustainable Development Goals (SDGs) of the 2030. Agenda for sustainable development. Available at: <https://sdgs.un.org/goals/goal12> (accessed 2.11.2020)
- Stensgård, E. A., Prestrud, K., Hanssen, O. J., & Callewaert, P. (2018). Food Waste in Norway. Report on Key Figures 2015-2017.

*Project leader of the BREAD project and researcher at the Centre for Technology, Innovation and Culture (TIK), at the University of Oslo.

NIFU

Nordisk institutt for studier av innovasjon, forskning og utdanning

Nordic Institute for Studies in Innovation, Research and Education

NIFU is an independent social science research institute, organized as a non-profit foundation. The institute aims to be a leading European research organization for studies of innovation, research and education at all levels. NIFU collect, analyze and disseminate national statistics and indicators for R&D and innovation, and are active participants in statistical cooperation at European and international levels.

NIFU

PB 2815 Tøyen, NO-0608 Oslo
www.nifu.no | post@nifu.no