

The ForMat project

Prevention of food
waste

Final Report

2010 – 2015

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Part 1

Examples &
Experiences

6

ForMat
in Brief

10

Measures
Implemented

22

Cooperation with
Other Actors

26

Research on
Food Waste

28

Evaluation of the
ForMat Project

Part 2

What the
Figures Tell Us

32

Methodology
and Data Basis

34

Overall Trends

46

Conclusions

48

The Way Forward
with Matvett

50

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According to the UN, about one-third of all food produced worldwide is thrown away. The production, transport and storage of food and the treatment of food waste all affect our environment. Food waste is also an ethical dilemma, since we know how unevenly world resources are distributed. Less food waste will provide more food for the world's growing population. There will also be less need for increased food production and a lower environmental impact.

Through the ForMat project, the government has since 2010 collaborated with the food industry to put food waste on the agenda in Norway. With its extensive surveys of food waste in most of the value chain, important consumer information and network projects between key players in the food industry, ForMat has helped to reduce food waste in Norway. The government has been a financial contributor and observer in the project.

Norway is involved in processes via the UN, the EU and the Nordic Council of Ministers to reduce food waste. The UN sustainability goal of halving food waste by 2030 has been an important guideline for many other processes, also at national level. ForMat has aroused international interest, both for the way its work is organised and financed and for contributing to a common methodology for measuring food waste through the EU FUSIONS project.

We strongly believe in collaboration to reduce food waste. We must all take responsibility: primary industry, food producers, wholesalers, retailers, restaurants and households. The chances of success are greater if we collaborate across the value chain. There is important work ahead. In 2015, the government signed a letter of intent with representatives of the entire food industry to reduce food waste. This is being replaced by a more specific agreement with reduction targets and measures in 2016.

This ForMat report summarises experiences and results from five years of collaboration between the food industry and the government. This is important knowledge for our further efforts to achieve the goals we have set ourselves.

Foreword



Photo by Bendik Schröder

Knut Maroni

Knut Maroni

Sverre Leiro

Sverre Leiro

The idea behind the ForMat project – food waste prevention – was conceived in 2008, the project started in 2009 and the final report is now available in 2016. The rationale was a growing recognition of the fact that large quantities of edible food were discarded which could have been given to the needy. The environmental impact would also be reduced.

ForMat was established as a collaborative effort between producers' and retailers' associations, and Ostfold Research was given responsibility for documenting the results of the work.

Matvett was established in 2012 as a measure to improve quality and financing and put food waste on the agenda in the entire value chain. Companies have covered about 60% of the cost and the government about 40%. Various awareness-raising and communication activities have been conducted in fruitful cooperation with organisations and companies. The project and the issue of food waste have received considerable media attention.

The creation of the Oslo Food Bank in 2013 is one visible result of this work. Date labelling of many foods with "best before" instead of "use by" is another. In their reports, Ostfold Research have shown that consumers are increasingly aware of the negative

aspects of food waste, but waste sample analyses show a difference between theory and practice. This final report reveals that much has been done to reduce waste of usable food. However, we are still only in the initial phase of this work.

Far more interested parties than the initiators are now behind the project, which has proved its worth through well-publicised activities and documentation. ForMat's work has been in focus at all levels of society, in the media and national and international researchers. A letter of intent on reducing food waste has been signed by the government and food industry organisations in Norway, representing a commitment to food waste reduction and financing for all parties involved.

We are proud to have contributed to this important project together with other enthusiasts. We are convinced that ForMat has not only increased the focus on food waste in general, but also has a far greater potential to benefit our fellow human beings and the environment. However, the attitude of each individual to our environment and food waste practices is still the most important factor.

ForMat – in Brief

The project idea arose in 2008, but it was not formally established until 2010. It had a tough start, but became stronger and more clearly defined each year until 2015. Many more people are now involved than the initiators, since the project has proved its worth through considerable interest and broad coverage of food waste reduction efforts, and solid evidence of the causes and extent of waste. Food waste has been placed on the agenda in Norway.

ForMat has been a five-year collaborative project between the food industry, organisations and the government; its main objectives have been to assess the extent of food waste and the reasons why it occurs in the value chain to the consumer, and to initiate preventative measures. ForMat has included food producers, wholesalers, retailers and consumers, but not primary industry and catering. The project has been funded by the government and the food industry.

Establishment and Organisation

The initiator of the ForMat project was the former director of the retail group Norgesgruppen, Sverre Leiro, when he gave a conference presentation in 2008 on unnecessary food waste throughout the value chain. The director of NHO (Confederation of Norwegian Enterprise) Food and Drink, Knut Maroni, took up the challenge and was joined by NHO Food and Bio, the Grocery Producers of Norway (DLF) and the Norwegian Grocery Sector's Environmental Forum (DMF) in establishing a food waste project in 2009, with a steering committee consisting of the project owners and other actors as described below.

Ostfold Research, which for several years had been working to document the extent of food waste, was an important partner and member of the steering committee from day one. Other major contributors to the creation of ForMat were the food research institute NOFIMA and LOOP, which provides educational programmes for young people about recycling. LOOP later withdrew from the steering committee, but has cooperated with ForMat on various projects. To ensure commitment and binding cooperation with the government, the Ministry of Agriculture and Food and the Environment Agency were invited as observers to the steering committee.

In the first years, the ForMat project management consisted of NHO Food and Drink in close cooperation with Ostfold Research. Halfdan Kverneland Olafsson was appointed part-time director from 2009 to 2012, but this appointment had to be terminated due to financial constraints and the director of NHO Food and Drink, Knut Maroni, took over as part-time leader until spring 2014.

In January 2012, Format was organised as an ideal corporation, with Matvett AS, NHO Food and Drink, NHO Food and Agriculture (formerly Food and Bio), DMF and DLF as owners. The long-term

aspect of the work and distribution of responsibilities between the participants were the main reasons for this decision. Finances improved and in spring 2014 Anne-Grete Haugen was appointed full-time general manager of Matvett. Communications manager Anne Marie Schröder has worked full-time in ForMat/Matvett since 2011.

In 2015, the Norwegian Hospitality Association became part-owner of Matvett, but was not on the ForMat steering committee or involved in its work.

Objectives

The steering committee made an early decision that the goal of the project would be 25% less food waste in 2015 than in 2010. This ambitious goal was not based on a rigorous analysis, but was an indication of the huge potential for reducing food waste in Norway.

Financing

It has been a challenge to finance the project. The owners have provided funding from the start, but government support has also been needed. The Environment Agency, the Ministry of Agriculture and Food and others have funded the project each year; however, this was unpredictable, being based on a new application each year and receipt of the funds near the end of the year.

To provide the ForMat project and the activities of Matvett with more reliable financing, a voluntary funding model was created in 2012. Food and beverage producers, who pay an annual fee for the collection and recycling of used packaging to Green Dot Norway, were asked to pay 3% extra annually for food waste reduction efforts in Norway. The scheme started in 2013, and was eventually well supported by the main food producers. By 2015, 32 companies had joined, contributing a total of about NOK 2 million. Including the funding from the owner organisations, the private sector accounted for 54% and the government 46% of the financing. Thanks to the predictable voluntary fee from companies and organizations, the financial situation improved greatly in the final phase of ForMat and ensures the continued existence of Matvett.

ForMat organised its work into three sub-projects:

Sub-project 1 – Food Waste Surveys

The aim of this sub-project was to gain insight into quantities/value and composition of food waste. Obtaining data from producers, wholesalers, retailers and consumers has been a challenge, and especially so for many food producers, who lacked adequate procedures for recording food waste. This has gradually improved but has required much attention, especially by Ostfold Research. There is now adequate data for the main products from food producers, wholesalers and retailers. For the consumer stage, waste sample analyses were conducted in 2011 and 2015, together with annual surveys of consumer behaviour and attitudes.

Ostfold Research was commissioned by ForMat to prepare annual reports describing and discussing trends in food waste on the basis of the results of the data collection and surveys. The main results of developments in food waste from 2010 to 2015 are to be found in Part 2 of this report.

ForMat also conducted workshops and surveys among producers and retailers to determine how these work systematically to prevent food waste, their motivational factors, how they organise the work and their need for relevant tools.

Sub-project 2 – Communication and Dissemination of Results

The aim of ForMat's communication efforts has been to put food waste on the agenda in general and to raise awareness of waste reduction in the entire value chain. Contact with the media has been crucial for success in this endeavour. Throughout the project period, the administration has been in direct contact with food producers, wholesalers, retailers and food sector organisations in order to find good solutions and increase awareness of efforts to reduce food waste in the industry. One of the challenges was that food waste was not clearly defined in companies. However, this was rectified during the project period.

Reduction of food waste has received increasing media attention through press releases and events, and the ForMat administration has achieved status as a knowledge bank for the media. Much of the dissemination of information has taken place via websites and social media. Matvett.no and matsvinn.no have served as toolkits and communication arenas

for consumers and the food industry respectively. To raise awareness of the issue, it was important to be present in different settings, such as the Food Waste Table, presentations and participation in debates. During the project period, ForMat has cooperated with a great many organisations, companies and local authorities which have helped to place food waste on the agenda. The project has also collaborated with teachers of nutrition and health in schools and with Young Enterprise, in order to increase awareness in the younger generation.

Close contact with the government has been crucial for the implementation of the ForMat project. Of particular importance was government representation in the form of observers from the Ministry of Agriculture and Food and the Environment Agency to the ForMat steering committee to keep abreast of the work and follow up various issues in the government. The fact that food waste was raised to the political agenda, especially by the ministers of those two ministries, was of great benefit in efforts to raise awareness of waste reduction work.

Sub-project 3 – Networks for Preventative Strategies and Measures

In order to arrive at solutions to prevent food waste in individual companies and in the interface between supplier and retail customer, ForMat has focused on organising networks. The primary goal of the network projects has been to enhance profitability for those involved. Other objectives were to form a basis for the improvement of existing standards that determine durability and its distribution in the value chain, as well as suggestions for further work on the sector agreement in 2016.

Specific results from the network projects described in more detail under “durability” and “tools” are as follows:

- Industry Guidelines: common methodology to measure and analyse food waste in companies, and suggestions for how to organise such work.
- The ForMat Check: a set of questions to assess a company’s current situation.
- Revision of STAND001, the standard for the distribution of durability in the value chain with the aim of minimising waste through a more flexible approach to distribution of durability.

Nordic and International Cooperation

Recent years have seen increased international attention to food waste. The reduction of food waste has been a good example of how to reduce environmental impacts by using more of the food produced. ForMat’s work in partnership with Ostfold Research has resulted in the two organisations representing Norway in several Nordic and international research projects.

In 2013, the Nordic Council of Ministers initiated an extensive Nordic food waste project with three sub-projects, involving all the Nordic countries except Iceland. The projects were concerned with food waste in primary industry, durability and redistribution.

These projects are continuing in 2016.

Success Factors

- ForMat has advocated to the government, food producers, wholesalers, retailers and consumers the voluntary reduction of food waste in Norway without the introduction of taxes or laws.
- Prior to ForMat, there were no statistics on food waste in Norway. A basic study of the extent and causes of food waste was therefore vital for an understanding of the importance of reducing food waste in Norway.
- Voluntary sharing of food waste data by companies is unique. The data collection has been time consuming, because many companies lacked the necessary overview of their waste, but it has also increased awareness among the companies.
- Strong personal involvement by individuals in the industry and the government has been, and will continue to be, necessary for progress in this work.
- Collaboration between government and industry has been important for success in creating an understanding that food waste is a challenge in society that everyone must help to resolve.



Former Minister of Climate and Environment Erik Solheim and food waste activist Tristram Stuart at ForMat's lunch, «Food for 2011», in front of the Parliament building.



Former Minister of Agriculture and Food Sylvi Listhaug, opening the ForMat conference in 2013.

Measures Implemented

By ForMat 2010–2015

Systematic mapping of food waste in the value chain shows that “past its expiry date” is the main reason for waste at all stages. The main focus in ForMat has been to develop measures that target the root causes of food waste. These involve the distribution of shelf life between the actors involved, packaging sizes and solutions, orders and forecasts that are not adjusted for fluctuations and poor consumer knowledge of durability labelling and correct storage of food.

Collaboration within the value chain is needed to successfully prevent and reduce food waste. During the project period, ForMat has developed various types of tools and measures either alone or in cooperation with others, in order to raise awareness and increase knowledge of the value of food and the economic, environmental and social effects of reduced food waste. ForMat has also liaised between the actors in the food industry and the government.

The Food Waste Table

Using the ForMat statistics on consumer food waste, the Norwegian Food Waste Table was created in 2012. This exhibition shows the extent and composition of the food a typical Norwegian throws away each year. The Food Waste Table has been utilised in various contexts by both ForMat and its partners, such as The Future in Our Hands and Green Living.

Social Media and Leftovers Thursday

Most information aimed at consumers has been communicated via social media, and since 2012 ForMat has shared weekly leftover tips on Facebook and Twitter under the concept of “Leftovers Thursday”, to maintain awareness of eating up fridge leftovers at least once a week. The leftover tips have generated considerable traffic to matvett.no.

Websites

Matsvinn.no was created in 2013 and is directed at the food industry, with information on food waste, examples from the industry, news, reports and simple tools that companies can use to learn more about their food waste, along with advice on how companies can start reduction measures in their own business and in networks with others.

Matvett.no is a consumer-oriented website started in 2011. It contains advice on how to take care of food and many good recipes for leftovers of raw and cooked food.

Presentations

During the project period, ForMat has given presentations on food waste at many seminars, conferences and other events, to further engage the food industry, encourage other actors to participate and sensitise consumers.

Media Coverage

ForMat has had extensive contact with the media, including its own press releases on results and actions, and the media have also contacted ForMat for comments on and contributions to their own reports. This has resulted in many large and small articles in all national newspapers and leading online newspapers, and on television on NRK, TV2 News and God Morgen Norge, as well as numerous articles in the local media. “National Leftovers Thursday” in November 2014 led to 18 different press, TV and radio reports.

The Oslo Food Bank

In 2012, ForMat was asked to work on the creation of a food bank in Oslo, and led efforts to achieve financing for its establishment and operation. The Oslo Food Bank opened in September 2013. Its members are the Salvation Army, the Blue Cross, the Church City Mission, the Gospel Centre and IOGT. In 2015, 800 tons of food were distributed, equivalent to 1.6 million meals.

Networks

To achieve solutions that will prevent food waste in individual businesses and in the interface between supplier and retail customer, ForMat has had a continuous focus on organising networks with the overall goal of enhancing the profitability of those involved. A further objective was to form a basis for the improvement of existing standards that determine durability and its distribution in the value chain.

Conferences and Events

During the project period, ForMat organised four major food waste conferences to update the government, companies and organisations on waste reduction efforts in Norway, Scandinavia and Europe. Results of the ForMat surveys were presented as well as examples of how the food industry and local authorities collaborate on waste reduction.

On the occasion of the award of the Sophie Prize to Tristram Stuart, ForMat organised the event “Food for 2011” at Eidsvoll Plass in Oslo on 16 June. Here, about 2000 people were served lunch based on surplus food from retailers and producers.

There have also been a number of networking meetings, smaller seminars and workshops related to food waste. ForMat has also helped to organise meetings for different research projects that the ForMat partners have been involved in.



The Food Waste Table

The Norwegian Food Waste Table has been one of ForMat's most important communication efforts to sensitise consumers about the economic, environmental and ethical consequences of food waste. The Food Waste Table is arranged on the basis of a detailed analysis of people's food waste.

The Food Waste Table shows the extent and composition of the food a typical Norwegian throws away each year. Much is original products such as bread, fruit and vegetables, fish and meat and some is meal leftovers such as pasta, rice and meat stews. This form of evidence of what and how much is discarded has opened a dialogue with consumers, and many now reflect more on how they can best take care of their food. The exhibition has communicated food waste at food and music festivals, food industry events, employee awareness efforts in various companies, local council environment days, etc.

“The Food Waste Table” has become a concept, appearing all over Norway in recent years. The brochure “Take Care of Your Food” has been distributed at the exhibitions with a quiz about food waste. Various waste companies, local authorities, universities and colleges have exhibited the table at their environment days.

For example, the Grenland waste company and Green Living/The Future in Our Hands have exhibited it for five years at the food festival “Mersmak i Skien”, reaching more than 20 000 people with the message not to throw away food. At various events with the Food Waste Table, leftover dishes or foods past their “best before” date have often been served. This is to show that “best before” does not mean “bad after” and to initiate a process to make consumers rely more on their senses, to eventually change how we take care of our food.

At least 34 food waste tables have been exhibited since the idea began in 2012, and more than 38 000 people have received information on how much we throw away and how they can best take care of their food. Good cooperation with various actors has been crucial in implementing the food waste tables.

Measures

When	Where	No. of people reached
August 2011–2015	«Mersmak i Skien» food festival, Green Living (x5)	20 000
28.10.2011	«Torvbyen», Fredrikstad	200
01.02.2012	World Snowboarding Championships, Wyllerløypa	2 000
02.06.2012	Oslo Environment Festival in Sofienberg Park	500
21.08.2012	«Re:Act Oslo» at Blindern	100
10.09.2012	HIAS Redesign/Environment Day in Hamar	500
15.09.2012	BIR Redesign/Environment Day in Bergen	500
29.09.2012	Retro Days in Sarpsborg with Green Living	500
31.10.2012	SILK Literature Festival in Skudeneshavn	500
01.06.2013	Environment Festival, Asker/Bærum, Green Living	500
10.06.2013	Environment Day in Sørum	200
01.07.2013	SIMAS Environment Day in Kaupanger, Sogn	200
16.08.2013	River Festival in Porsgrunn, RIG and Green Living	1 000
16.08.2013	Pstereo Music Festival in Trondheim	1 000
16.09.2013	Press conference with Siemens in Oslo	20 press articles
21.11.2013	Leftovers Thursday, Nobel Peace Centre, Oslo	50
27.02.2014	Environment Day with waste company in Verdal	200
08.04.2014	Climate meeting, Nøtterøy, The Future in Our Hands	75
24.–25.05.2014	Miniøya Music Festival in Tøyen Park, Oslo	500
18.09.2014	National Leftovers Thursday, 9 locations in Norway	1 000 + press
19.–21.09.2014	«Midt i Matfatet», The Future in Our Hands, Hamar	6 000
14.12.2014	Shopping Mall in Asker, The Future in Our Hands	400
08.01.2015	Final of «Det Norske Måltid» in Stavanger	100
25.03.2015	Sodexo and DNB in Oslo	100
15.04.2015	Kick off KUTT Gourmet at Blindern in Oslo	50
08.05.2015	Final of TRIPPEL at Doga in Oslo	100
14.08.2015	Arendal Week with NHO Tourism	200
17.09.2015	Sodexo and KLP in Oslo	50
18.09.2015	«Midt i Matfatet», The Future in Our Hands, Hamar	3 000
15.10.2015	DLF autumn meeting, Quality Hotel, Tønsberg	100

Tools for the Food Industry

Many companies have requested methods to measure and prevent food waste. To answer this need, ForMat, through its networking projects with industry players, has developed methods and tools that can help companies to track their waste and implement reduction measures.

Prevention and reduction of food waste should be a natural part of a company's continuous improvement work and daily operations.

Knowledge networks involving representatives from management, finance, quality and environment are important in this work.

ForMat has produced a guide entitled "How to Reduce Food Waste", describing how such work should be organised, and the "ForMat Check" that maps the current situation in a company.

A Guide for the Industry

The guide "How to Reduce Food Waste" is aimed at food producers and retailers. It contains examples of how companies can ensure that food waste prevention becomes part of their continuous improvement work.

The guide can be downloaded from matsvinn.no, which also contains news, information about food waste, examples of waste reduction measures in the industry and reports on food waste.

A key aspect of the guide is the *four-step model*, which illustrates how a company can best proceed to find out the real reasons for its food waste, and how effective measures can be implemented. Work across departments is the key to success, and the company should establish a project team of staff with thorough knowledge of the different parts of the business to

implement a project in the company based on the four-step model. Both management and employees should be strongly involved in the project.

The ForMat Check

The ForMat Check was developed to help companies keep track of their food waste. By taking this check, companies get an idea of the current situation in their business. The check consists of questions on the company's waste disposal, work organisation, whether there is an overview of costs related to food waste, the waste reduction measures already implemented and the company's potential for future reduction. The ForMat Check is available at matsvinn.no/sjekk

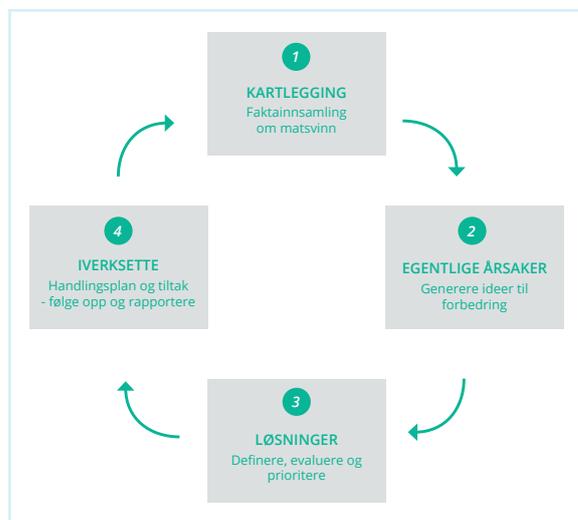


$\frac{1}{3}$ of food waste comes from food producers or retailers. That corresponds to all the frozen pizzas sold in Norway over five years.

Measures



The ForMat Guide for the Industry



The four-step model



The ForMat Check at matsvinn.no

Key Figure 1: Production

Food waste as a proportion of production =

$$\frac{\text{Annual amount of waste}}{\text{Total annual production}}$$

Key Figure 2: Cost

Cost of food waste in tons =

$$\text{Amount of waste in tons} \times (\text{Sales value per ton} + \text{Treatment cost per ton})$$

Key Figure 3: Proportion of Sales

Waste as a proportion of sales in NOK =

$$\frac{\text{Amount of waste in tons} \times (\text{Sales value per ton} + \text{Treatment cost per ton})}{\text{Annual sales in 1000 NOK}}$$

The ForMat Key Figures

Measures Implemented

By Producers and Retailers 2010–2015

The ForMat project has encouraged food producers, retailers and other actors to develop and implement various food waste reduction measures during the five-year project period.

Food waste is a challenge for the profitability and reputation of the industry and its prevention is therefore part of everyday improvement work. Since “past its expiry date” is the main cause of food waste throughout the value chain, ForMat has focused on initiating actions and networks in the food industry which aim to solve key challenges related to durability, orders, forecasting, better product and packaging solutions, clearer labelling, advice on proper storage and use of leftovers and campaigns that do not lead to hoarding.

Smaller Loaves of Bread

Fresh baked goods have high waste. The launch of smaller loaves was mainly aimed at small households, but also larger families who prefer different kinds of bread. Small loaves have the same price per kilo as ordinary bread and are available in all chains.

Ugly foods

Rejects that become saleable products are important in preventing food waste. These may be freshly processed foods such as turnip mash, pickled cabbage, red cabbage, potatoes with skins or marinades based on potatoes with skin blemishes. One producer stated that 77% of the raw material in these products consists of rejects that would otherwise be used in production of other low-value products or discarded.

«Peculiar Fruit and Vegetables»

The sale of second class “peculiar fruit and vegetables”, as they are called in Norwegian, at 30% off is an example of how the industry provides alternatives to consumers. The usual items are also available, while the “peculiar” products are clearly displayed separately.

More Use of «Best Before»

Food producers are responsible for date labelling. “Best before” is a quality label, indicating when the food is at its best, but if stored correctly, it can be sold and consumed after this date. Since 2010, many more products have been labelled “best before” rather than “use by”.

Reductions

Reduced prices are an important measure to combat food waste in grocery stores, and give consumers good quality food at a lower price, while helping to lower the environmental impact of food waste. All chains currently make use of reduced prices.

In-store Consumer Promotions

Social responsibility and food waste as themes for promotions are examples of how the food industry raises consumer awareness. Campaigns that encourage consumers not to buy more than they need of each product are a new angle from the grocery trade.

Smaller and Better Packs

Several producers have launched smaller consumer packs and packs with improved opening and closing. Sliced cheese, salami and sour cream containers with screw caps and salad containers with effective closing are examples of how better packaging can help consumers take care of their food.

The Importance of Social Media

Several chains have dedicated resources to active use of social media. Here consumers can find recipes and advice on how to take care of their food. This kind of communication makes a positive contribution to food waste reduction.

New Packaging Gas to Prolong Shelf Life

New techniques have given many foods a longer shelf life. Fresh mince with a packaging gas containing high carbon dioxide increased its durability from 9–10 days to 14–18 days. This reduced waste from 8.7% to 2.5%. There is also ongoing research on the addition of CO₂ emitters to prolong the shelf life of packaged fresh fish.

The Oslo Food Bank

ForMat has been involved in work to create and finance the Oslo Food Bank, and was project manager in 2012 until the cooperative was founded in December that year. Today the Oslo Food Bank is a collaborative effort between the food industry and various charities, receiving and distributing 70–90 tons of food every month. In 2015, it redistributed almost 800 tons of food, equal to 1.6 million meals.

The Importance of Packaging

Packaging plays a key role in ensuring product quality and reducing food waste. One example is seedless grapes. After these grapes began to be packed in suitable containers directly from harvesting, waste from harvest to consumer was reduced by 75%. Previously, waste of grapes sold loose was 15–20%

Shelf Life/Durability

Correct date labelling of food is very important to minimise food waste in the value chain. Food waste is a particular challenge for fresh foods with a short shelf life (less than 42 days). Producers are responsible for determining the type of date labelling and total shelf life.

Recent research under the Nordic Council of Ministers reveals major differences in how producers in the Nordic countries determine the expiry date, even though there is common legislation for date labelling of food throughout the EU/EEA. Norway has the longest shelf life for most foods. For example, Norwegian milk has up to one week longer than Swedish milk. This may be related to different temperatures in the cooling chain; Norwegian milk is stored at 4°C, while Sweden practices 8°C. However, Swedish producers much more often label their products with “best before” than in Denmark, Norway and Finland.

New packaging technology that prolongs shelf life helps to reduce food waste. Researchers at Nofima have found that vacuum packaging and the use of CO₂ emitters for e.g. salmon fillets prolong shelf life by at least two or three days. MAP (modified atmosphere packaging) has increased the durability of e.g. salad spreads.

Two Types of Date Labelling

“Best before” labelling indicates when the producer believes the food has the best quality, but it can still be good long after the date shown if properly stored. All dairy products, eggs, cheese and whole pieces of beef, pork, lamb and game are labelled “best before” and are often edible long after the date. It is perfectly legal to

sell food labelled “best before” after the date; the store is then responsible for acceptable quality of the product. There is no risk involved in tasting or smelling the food to check whether it is still edible.

Food labelled “use by” is perishable. The date indicates the last day it can be eaten when correctly stored in unopened packaging. Examples of such foods are fresh sliced meat, mince, chicken, sausages and fresh fish. It is illegal for stores to sell food marked “use by” after the expiry date.

The next page presents examples of changes in durability that have had a positive impact on food waste reduction.



Fresh meat products always used to be labelled ‘use by’, even though they could be eaten one or several days after the date. We have therefore in recent years switched to ‘best before’ labelling on several items in our range.

Beate Folgerød,
Quality Manager,
Nortura

Measures



From «Use By» to «Best Before»

Since 2010, several leading Norwegian companies have revised the date labelling on their products, changing to “best before” on all suitable products as long as this does not compromise food safety. In its communication work, ForMat has highlighted the differences in date labelling and urged consumers to use their senses before discarding food that has passed the “best before” date.

Correct date labelling and handling of food labelled “best before” could significantly reduce future food waste. If all producers go through their product portfolio and change labels to “best before” where appropriate, if stores decide to sell good quality food which has passed the “best before” date at a reduced price and if more consumers become aware of date labelling and use their senses before throwing away food, good results can be achieved throughout the value chain.

Longer Shelf Life means Less Waste

New figures from a Nordic research project organised by the Nordic Council of Ministers shows that longer shelf life as a result of new packaging technology has led to lower waste. This example is taken from Norfersk, which changed the packaging gas on its minced meat from high oxygen (70% O₂/30% CO₂) to 60% CO₂/40% N₂. This prolonged the shelf life from 9–10 days to 14–18 days. Results from a survey show that waste of this mince was reduced from 8.7% to 2.5%.

Knowledge exchange and closer cooperation between the parties on regulations and “best practice” (on e.g. date labelling) help to prevent food waste. For this reason, ForMat held a seminar for the food industry, research institutions and the Food Safety Authority (FSA) on the results from the Nordic project and good examples from the industry on how to address the issue.



Dynamic durability is systematised common sense. The Food Safety Authority is positive and supports this practice, which will give milk a longer shelf life in cold weather. This will help reduce waste, particularly in stores.

Johan Lanestrånd,
Q Dairies

New Standard on Distribution of Durability

Expiry dates on food or excessive storage are the main causes of food waste by producers, wholesalers and retailers. A priority of the new standardisation STAND001 is to expose goods produced to the consumer. Division of durability into three is maintained, but if the limits in the STAND table are exceeded slightly, the parties are expected to seek the solution that involves least food waste.

To improve flexibility and durability in the value chain, three important new elements have been added to the standard, which the parties are encouraged to use: the use of bilateral agreements, dynamic durability and the recording of actual storage time. ForMat has contributed to these changes in partnership with DMF, DLF and STAND.

Price Reductions

Reducing the prices of food with a short shelf life leads to lower waste. As many as 8 out of 9 Norwegians have bought food with a short shelf life at a reduced price. High acceptance by consumers and more stores using the scheme make price reductions a powerful driver for lower waste in retail.

Reduced prices on food with a short remaining shelf life are an important measure to reduce food waste in stores and an example of good use of resources. Food is sold instead of being discarded, which means increased sales and lower expenditure on waste disposal. Consumers get perfectly good food for less money and the environmental impact of food waste is reduced. Early in the project period, ForMat began to emphasise reductions as a useful measure for grocery chains. Analysis shows that this is an effective waste reduction measure.

Consumers Buy at Reduced Prices

A survey conducted by Opinion for Matvett in 2014 showed that 8 out of 10 Norwegians reported buying food at reduced prices due to short shelf life, especially consumers under 40 years old. High consumer acceptance is an important reason why price reductions should continue to be a priority. All Norwegian grocery chains have now introduced solutions for lower prices on food close to its expiry date, although the way this is done varies between chains.

Reductions in all Stores

All grocery chains offer reductions on food with a short shelf life. To help consumers find these items, some stores place them in separate refrigerated displays or different coloured refrigerators. To reach a broader customer base than those who are most price-conscious, some stores have emphasised “the environment” in advertising reductions. Examples of such messages

are: “Short shelf life: 50% off. Save the environment: save money” and “Save the environment and money. Products labelled ‘reduced’ are on sale because of their date stamp. Eat today: we save the environment and you save money”.

Systematised Reductions

One of the challenges in price reductions was that the automatic ordering system did not record the difference between ordinary sales and reduced price sales. One chain therefore introduced systematic reductions, whereby sales at reduced prices were recorded at both store level and item level. The item is recorded as sold, but the purchasing system shows clearly that it was reduced, eliminating the need to record it as waste. The price is reduced at the same point that the product would otherwise have become waste. The individual store decides on the items to be reduced and the discounts to be offered.

Here at Meny, we’ve long had reductions, but what’s important is that this has now been systematised and involves routines. Price reductions are one of the measures that have led to a 25% reduction in food waste at Meny over the past three years.

Vegard Kjuus,
CEO of Meny



**Spar miljø
og penger**

Produkter merket "NEDPRISET"
har tilbudspris pga. holdbarhet.



**Spis i dag, så sparer
vi miljøet og du penger.**



-31%

PIZZA



19⁹⁰

500g



Photo by Bendik Schrøder

Cooperation with Other Actors

Matvett has been well supported in its work via the ForMat project. It is gratifying that those involved with food and with consumer and environmental issues, as well as the media and other large companies, approach Matvett for information and cooperation on food waste. The household is where most food waste occurs, and to change people's attitudes, it is important to spread knowledge about how to handle food and plan meals to avoid creating unnecessary waste. Results from recent surveys show that ForMat's communication work is having some effect, as more people now understand that the "best before" date does not necessarily mean "bad after", and people have also become more aware that proper storage of food is related to durability.



National Leftovers Thursday

In autumn 2014, ForMat/Matvett organised National Leftovers Thursday in cooperation with the Consumer Council and Kiwi in nine locations. Staff at the local offices of the Consumer Council organised food waste tables, served waffles based on surplus ingredients and held competitions. Matvett held a breakfast event in Oslo on the same day at Hundsvund School in Snarøya. Here pupils heard about the impact of food waste on the economy, environment and society, while enjoying a tasty breakfast of yesterday's bread topped with food past its "best before" date.

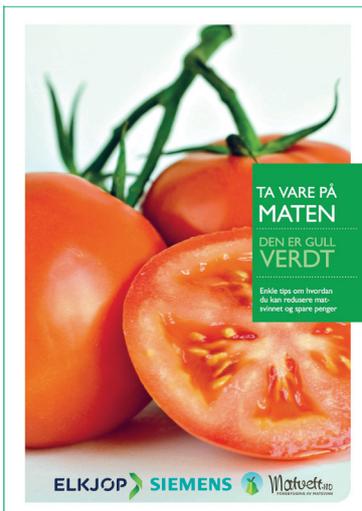


Oslo City Council

In collaboration with Oslo City Council Waste Department, ForMat/Matvett conducted a campaign on food waste in November 2014, where the main message was that food past its "best before" date should not be thrown away until it has been seen, smelled or tasted. This message could be seen on posters in 36 shelters in central Oslo. In this connection, a survey by Opinion for Matvett was also conducted, where consumers were asked whether they knew the difference between "best before" and "use by" and whether they buy food reduced in price because of its short shelf life. Eight out of ten answered yes to the latter question and 89% replied that they are entirely or quite sure of the difference between the two kinds of date label.

IKEA Catalogue Launch

To reach a broad public, it is important to cooperate with actors with a large customer base. IKEA launched its 2015-16 catalogue “Life in the Kitchen” with food waste as a focus area. ForMat/Matvett was invited as an advisor and provided information and materials prior to the launch. A workshop on proper storage of food was also held, which ForMat/Matvett helped to lead. See the IKEA launch website here: atbar.kampanje.ikea.no/inspirasjon/#barekraftigkjokkentips



GRØNN GUIDE TIL OSLO

10 GODE TIPS TIL Å KASTE MINDRE MAT

Hvert år kaster nordmenn over 300 000 tonn mat som kunne ha vært spist. Er du en av dem som kaster mat? Her er enkle tips til hvordan du kan ta bedre vare på maten og spare både penger og miljøet:

01. Planlegg innkjøpene dine og bruk handleliste.
02. Rydd i kjøleskapet, så du vet hva du har.
03. Oppbevar maten din riktig. Husk at fisk og kjøtt må ha det kaldere enn grønnsaker.
04. Bruk sansene dine. Ikke kast mat selv om den har gått ut på dato før du har sjekket om maten fremdeles er bra.
05. Avkjøl maten raskt og frys eller legg i kjøleskapet det du har til overs.
06. Oppbevar rester i tette bokser.
07. Frys brød som ikke skal spises neste dag.
08. La torsdag være «restetorsdag». Bruk opp rester av råvarer og av ferdige retter før du handler ny mat til helgen.
09. Flere råd og gode oppskrifter finner du her på matvett.no eller i boka «Restekjærlighet» som du får kjøpt i bokhandelen.
10. Få flere gode tips på www.matvett.no og Facebooksiden til Matvett!

16

Restetorsdag

– ta vare på maten!



Vi kaster all for mye mat som burde ha vært spist. Spar penger og miljøet og bruk opp det du har av rester før du fyller kjøleskapet med fersk mat. La torsdag bli din nye restematdag!

Få tips og inspirasjon her:



Matvett.no
FOREBYGGING AV MATSVINN

Green Guide to Oslo

In connection with the 2012 Oslo Environmental Festival, a green guide to Oslo was produced jointly by Oslo City Council, ForMat, Green Living and others. Among the tips in the guide were the introduction of Leftovers Thursday and the Matvett rules.

Elkjøp & Siemens

This joint campaign, initiated in 2014, focuses on correct storage of food in the fridge, and all key staff involved in domestic appliances in both companies have been on courses and been encouraged to be ambassadors for Matvett. The campaign continued in 2015, both internally and in Elkjøp's roughly 90 large and small outlets, with brochures and giveaways. The aim was for staff to give customers buying fridges information about proper storage and the importance of a low enough fridge temperature to preserve food better. Elkjøp stores had the “Take Care of Your Food” brochure available to customers in its domestic appliance departments in 2015.

Communicating Food Knowledge

Food bloggers and others involved in food, diet and the environment are constantly looking to cooperate to increase knowledge about food. There are now numerous articles and recipes on websites and in food magazines. In order to engage consumers, Matvett/ForMat has participated in food festivals and other events, either itself or via The Future in Our Hands and companies wishing to focus on food waste. The Food Waste Table, competitions, distributing brochures and serving surplus food are all activities that create a dialogue with consumers.

Food Waste Table at Sodexo

Photo by Pernille Brekke Hanssen

»»»



Photo by Kristina Kvam

Kutt Gourmet

Food waste reduction is all about profitability and social responsibility. The “Kutt” concept was developed as part of “Trippel” in 2014, a project initiated by Scandinavian Design Group, where different actors work together to find concepts that can make social responsibility in the value chain profitable. Oslo and Akershus Student Union runs Kutt Gourmet in cooperation with Matvett/ForMat and Compass & Co., with the aim to raise awareness and reduce food waste in the value chain and among students.

Kutt Gourmet serves a surplus food lunch to Oslo University students four days a week, based on food close to its expiry date. Meals are prepared by cooks from the Student Union and sometimes served by young people from Compass & Co. The ingredients are surplus food from producers and retailers.

Cafes are an important showcase for Matvett/ForMat, who are attempting to inspire the food industry to collaborate on measures to reduce food waste and make social responsibility profitable, i.e. selling discounted food, which is then used to make good meals instead of being discarded. Kutt Gourmet shows that cooperation is necessary and the solution to important challenges in society. In the future, it will be important to expand the measure to student organisations around Norway and to other types of business, such as canteens and restaurants, where handling of one’s own and suppliers’ waste is a challenge. The benefits of Kutt Gourmet are threefold: better use of resources, enhanced knowledge and lower environmental impact.



«Leftover Love» for All

We consumers throw away a lot of food, and lack of knowledge and inspiration are important reasons why pan and plate leftovers go into the bin. In 2011, ForMat signed an agreement with Dinamo to publish the book “Loving Leftovers: The Big Leftover Cookbook” written by Sara and Klaus Døschler.

“Loving Leftovers” contains many good tips on utilisation, storage and cooking of various foods as well as many exciting recipes. It is both a reference book and a cookbook for food lovers, with dishes that are perfectly possible to make, in terms of both time and level of difficulty. A book for ordinary busy people. The recipes in “Loving Leftovers” also form the bulk of the recipes at matvett.no.

The book has been sold and distributed in connection with many food waste table events and customer loyalty programmes. It has also been given as a gift to a large number of people.

Cooperation

Communicating Food Waste Knowledge

Format has collaborated with many different actors in education and local government who work with environmental and food issues. A sustained long-term effort and good communication tools are needed to increase people's understanding of the impact of food waste on one's finances and the environment.



Local Councils and Waste Companies take Responsibility

Cooperation with local councils and waste companies is vital for broad dissemination on food waste and reaching people directly. A dozen municipal waste companies have arranged food waste tables and shared information material from ForMat on websites, in social media and in customer magazines. ForMat has also sometimes been present with a food waste table and leftover waffles or surplus juice, e.g. at the Oslo Environmental Festival and the Asker Environment Day.

In 2013, Akershus Rural Women's Association published a calendar with leftover recipes in collaboration with ForMat, and in Asker Town Council's customer newspaper, ForMat contributed four pages of tips on taking care of food and recipes for leftovers.

Collaboration on Educational Tools for Schools

In providing effective information and tools for children and young people, an important partner has been LOOP Environmental School, which offers educational programmes on recycling and recovery.

- “The Food Waste Struggle” is a film that shows the journey of food and the resources required to produce a few fish fingers. It also highlights how easy it is to throw away less food by better planning of shopping and proper storage of food.
- “The Waste Pyramid” is a digital tool showing how the hierarchy of waste works, with exercises to give pupils an understanding of the best use of resources for food and other products. Food waste prevention represents the top layer of the pyramid.

«Young Enterprise» Focuses on Food Waste

ForMat has been involved in the Young Enterprise “entrepreneurship camps” at various secondary schools in Østfold, where pupils were asked to find good solutions to the problem of food waste in households or society at large. Examples of ideas presented were an app that tells you what is in your fridge to prevent you buying the same food twice, a food scanner that tells you whether food is edible even after its expiry date and campaigns using humour and factual information to encourage consumers to throw away less food.

There was also a proposal to tax food waste using a weighting system: “The more food you throw away, the more you pay for waste disposal”.

Research on Food Waste

To gain new knowledge of methods and best practices related to food waste prevention, relevant research is necessary. There is a further need for basic data, as there are no government statistics on food waste. ForMat has been involved in numerous national, Nordic and European research projects since 2010. The findings from this research are used in the design of measures to prevent and reduce food waste.

Food Waste Prevention

This project was conducted in 2010-14 and was funded by the Food Programme (now BioNær) with Ostfold Research leading the project, in collaboration with SIFO and Nofima. The project was closely linked to ForMat, and included an analysis of packaging technology for meat, fruit and vegetables and analyses of waste by retailers and consumer behaviour. There was also an extensive waste sample analysis and consumer studies in cooperation with the ForMat project in 2011, in order to analyse how behaviour and attitudes to food waste vary between different consumer groups. An associated doctoral dissertation in anthropology is being completed at SIFO.

A European Research Project

FUSIONS was a large four-year EU project completed in 2016, with the main aim to develop a common methodology for mapping food refuse and food waste. A manual for national statistics on food waste in Europe covering the entire value chain was produced, with proposed methodology for data collection, analysis and upscaling. This manual can be an important tool in the work on the food sector agreement with the government.

The project has also focused on measures and social innovation for the prevention of food waste.

FUSIONS was led by Wageningen University in the Netherlands, with Ostfold Research as a partner and ForMat as a member, contributing presentations at regional and European meetings and hosting a regional meeting.

Nordic Food Waste Projects

The food and agricultural section of the Nordic Council of Ministers has completed a major project on food waste from 2013 to 2016, with three sub-projects:

- Methodology and definition of food waste in primary industry in the Nordic countries
- Determination of durability of foods in the Nordic countries and how appropriate durability may affect food waste
- Redistribution of food via the Oslo Food Bank and local organisation

The Agriculture and Food Ministry has been a member of the steering committee, and Ostfold Research has participated in all three sub-projects and was responsible for the latter two. ForMat has been involved via its partner food producers and contributions in reference groups and at various meetings in the sub-projects. The project formed part of the Nordic prime ministers' commitment to "Green Growth" and aroused great interest in the EU and internationally.



Senior Researcher at Nofima Marit Kvalvåg Pettersen is involved in packaging projects to reduce food waste.

Correct Packaging to Reduce Food Waste

“REforReM” is an ongoing three-year Norwegian research project (2015–2018), which aims to develop new packaging solutions that reduce food waste, with a focus on the production, retail and consumer stages. Tomatoes, cauliflower, lettuce, sliced meat, mince, sushi and packaged fresh fish are the foods included. The work is divided into three work packages: 1) Packaging Technologies, 2) Consumer Behaviour and 3) Documentation of Impact on Environment/ Value Chain. ForMat/Matvett is involved, along with Nofima, Ostfold Research, BAMA, Grilstad and Lerøy, as well as several equipment and packaging suppliers.

«COSUS»

“Consumers in a sustainable food supply” is a three-year EU project (2014–2017) which aims to motivate consumers to make sustainable choices which reduce food waste, such as buying/selling food that looks different or has passed its “best before” date. ForMat/Matvett is on the Expert Advisory Board and assists COSUS by providing information and materials to

test what is needed to sensitize consumers. NMBU and Nofima head the Norwegian work; Norway is one of five European countries taking part.

New Packaging to Prolong Shelf Life of Bread

“Breadpack” is a research project aiming to develop new packaging solutions for bread to prolong the shelf life of fresh baked goods for consumers. Further objectives are to reduce costs in the supply chain, to reduce food waste and lessen the environmental and resource burden of baked goods and their packaging and distribution. Participants in the project, apart from ForMat/Matvett, are Cernova, Ostfold Research, the Federation of Bakers and Confectioners, Emballasjeforsk and Nofima, in addition to several packaging manufacturers.

Evaluation of the ForMat Project

Participating companies from the production and retail stages, companies from other industries and voluntary organisations have been good partners and provided important feedback on work initiated and completed by ForMat.

To assess the benefit of the project and elicit suggestions for further work on waste reduction in the food industry, a survey in the ForMat network of companies was conducted. The response rate of 55.4% of 148 companies was high in comparison with similar surveys, and over 8 out of 10 said that they knew the ForMat project well or very well. The feedback is therefore of good quality. The following is a summary of the main results.

ForMat is of Great Benefit

Almost 80% are satisfied with the results of the ForMat project. Four areas in particular have been helpful for the respondents:

- Access to data on waste from the industry
- Information to consumers
- Lobbying with the government and other actors
- Visibility in the media

Expectations Fulfilled

About 75% agree with the main focus areas of ForMat's work; this is also seen in the high satisfaction score. Feedback on areas that should have been given greater

priority suggests rather more focus on the interaction between store and consumer, more pressure on food producers to participate in network projects with retailers, closer cooperation between retailers and suppliers to share real-time data for a better overview of foods with high waste and more information directed at school pupils.

«» ForMat brings players in the value chain together and is an effective arena for solving common challenges to combat food waste. **Logistics Manager, food industry**

Continued Need for Joint Efforts

Feedback on the areas Matvett ought to focus on in the continuation of ForMat is vital for future success. The main areas are summarised in the points below:

- Knowledge of the causes of food waste by producers, retailers and households
- Continue with food waste statistics in Norway



Motive from an animation
produced for Matvett

- Contact with the government to exert influence
- Organisation of campaigns to enhance consumer awareness and knowledge of food waste
- Methods to measure and prevent food waste in networks between actors in the value chain

Input on other areas that should be prioritised:

- Information on alternative ways of treating food that cannot be sold to people and specific details of the different methods
- CPR methods for producers to achieve effective grassroots network collaboration with NGOs, local authorities and others. Encourage local initiatives by private individuals, local authorities and NGOs
- Encouraging action by industry and consumers is more important than providing detailed information on facts and causes
- Food waste as part of food-related vocational training. Food waste is a “residual raw material” to be used for new value creation



The focus on food waste through campaigns, surveys and preventative and educational activities has helped to raise awareness for our decisions and processes. **CEO, food producer**



ForMat has played an important role in bringing together the parties to discuss and work out solutions with waste reduction in focus. ForMat has been a driving force in facilitating and ensuring progress in this work. **Environment Manager, grocery chain**



To change you have to know,
to know you have to measure,
to measure you have
to know how and what
to measure.

– Peter Drucker

What the Figures Tell Us

The goal set at the start of the ForMat project was a 25% food waste reduction by the end of 2015. Ostfold Research, on behalf of ForMat, has been responsible for surveys of food waste by producers, wholesalers, retailers and consumers. This part of the report shows trends in food waste from 2010 to 2015¹.

The data collected by ForMat is a unique compilation of annual food waste statistics, providing knowledge of composition and amounts of food waste, where in the value chain most food is discarded, developments over time and the reasons why food waste occurs in the value chain. The same methodology is used in the final report as in previous reports. Further data consist of calculations of economic loss and CO₂ emissions related to the production, packaging and transport of food waste.

This part of the report tells us whether food waste was reduced during the project period and whether consumer behaviour and attitudes towards food waste have changed. It also reveals the financial and environmental effects of changes in food waste over the last five years.

The final section of this part of the report contains a discussion of how far ForMat has succeeded in its goal of a 25% reduction in food waste, and what is required to continue food waste reduction efforts in Norway.

¹ The results presented in this part are taken from the final report of the ForMat project from 12.09.16, entitled "Food Waste in Norway 2010-2015", by Stensgård and Hanssen.

Methodology and Data Basis

The basic data for the ForMat project are food waste as a percentage of quantity produced (tons) for the production stage and as a percentage of sales (value in NOK) for the wholesale and retail stages. For the consumer stage, there were surveys on consumer discard habits and in 2011 and 2015, waste sample analyses from households.



Food waste includes all food that could or should have been eaten by humans, but which for some reason has not been made into human food¹

The following national key figures were calculated for all stages:

- Total amount of food waste (tons per year and kg per capita)
- Costs associated with food waste (in million NOK)
- The environmental impact of food waste (tons of CO₂ eq.)

Food Waste by Producers

The proportion of food waste by producers was identified in cooperation with the companies participating in the ForMat project. These represent a wide range of production facilities and cover about a quarter of total sales by Norwegian food producers.

To calculate national waste figures for producers, the production volume was multiplied by the waste recorded by the ForMat companies in their respective product groups. Since the percentage of waste was used as a basis for scaling up, the basic data were also adjusted for waste associated with major events or extraordinary operations, in order to even out the natural fluctuations in a company's waste.

Food Waste by Wholesalers

The proportion of food waste by wholesalers was calculated on the basis of data from a large number of warehouses in Norway. The data mainly apply to product groups distributed through wholesale companies in Norway, and only to a minor extent those distributed directly from producer to retailer. Food waste by wholesalers is calculated as a percentage of sales.

To calculate national waste figures for wholesalers, the price in NOK per kg was used to convert from economic value to tonnage. The market share of the reporting companies in the retail segment was used to scale up the figures.

Food Waste by Retailers

The proportion of food waste from retailers was calculated on the basis of waste data in 89 stores from 2013 to 2015. The stores are a representative cross-section of retail grocery outlets in Norway, with regard to geographical location, population density, and stores with and without fresh food sections. Food waste in stores is recorded as net value, and sales for all stores were also recorded, both overall and for the 21 commodity groups analysed. The groups included in the survey of food waste represent about 56% of total sales, and thus do not provide a complete picture of the food waste, but they cover the main areas of food products.

For calculation of national food waste figures for retailers, data from 29 stores belonging to one chain were used in 2010–2011, 59 stores from two chains in 2012, and 89 stores in three chains in 2013–2015. The stores selected were representative of the chains; this was quality controlled by the chains themselves. The individual chains

¹ Definition of food waste in the ForMat project

Product group ²	Produkt category
Frozen food	Frozen ready-made food
Fresh fruit and vegetables	Fresh fruit, fresh vegetables, fresh potatoes
Fresh baked goods	Fresh bread
Fresh ready-made food and delicatessen items	Fresh ready-made food, sausages, sliced meat and pâtés
Fresh fish and shellfish	Fresh fish
Fresh meat	Fresh meat, minced meat
Eggs	Fresh eggs
Dairy products	Milk products, cheese
Dry goods	Durable baked goods, baked goods, dressings, spiced sauces and oils, biscuits, sweet sandwich spreads in jars and cans, sauces and clear soups, snacks

in the sample were scaled up to national level on the basis of their market share for the period.

Just as for wholesalers, the data from retailers are expressed as economic value; therefore, in order to calculate the amount of food waste in the retail stage (in tons), key figures in NOK per kg were used for converting food waste from economic value to tonnages.

Food Waste by Consumers

Consumer Studies: To study food waste by consumers and trends in consumer behaviour and attitudes related to food waste, annual surveys were conducted from 2010 to 2015.

Two samples of 1000 respondents, representative of Norwegian consumers, were interviewed each year. One survey dealt with food discard habits and the other with behaviour and attitudes related to food waste. The results from the consumer surveys are based on respondents' own statements about their food waste and behaviour, and thus do not reveal what or how much consumers throw away in reality. This only emerges from waste sample analyses.

In addition to the responses on food waste, data were also collected on age, gender, place of residence,

education, social status, number of persons in the household and household income for all respondents, to enable responses to be analysed in terms of different consumer characteristics.

Waste Sample Analyses: Two waste sample analyses were conducted during the survey period, in 2011 and 2015. Both were based on the same methodology and were conducted in the same way to allow the results to be compared and used to measure developments over time.

Waste was analysed from a random sample of households in Fredrikstad and Hallingdal. Mepex Consult was responsible for the implementation, analysis and upscaling of the data.

The results were scaled up to national waste figures with the help of Statistics Norway's KOSTRA statistics (central and local government reporting).

Amounts of food waste by consumers in 2010, 2012, 2013 and 2014 have been estimated by extrapolating the figures from 2011 and 2015 to ensure comparability throughout the period, but this means that for much of the period the national key figures for consumers are only estimated values. Therefore, only the results from 2011 and 2015 are completely reliable.

² Food waste was studied for 9 product groups subdivided into 21 categories throughout the value chain.

Overall Trends

The total amount of food waste fell by 7 % from 380 575 tons in 2010 to 355 128 tons in 2015. Measured in kg per capita, this corresponds to a 12 % reduction. Food waste in tons was reduced in all stages of the value chain except the wholesale stage, which represents only 1 % of waste. Consumers still waste the most food and account for 61% of the total amount, while producers account for over one-third.



355 128

tons of edible food are
wasted in Norway.

20.5 bn.

kroner is the annual cost of
food waste.

978 000

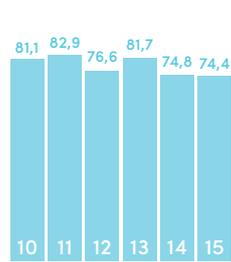
tons of CO₂ equivalents are
the annual emissions from
food waste.

12 %

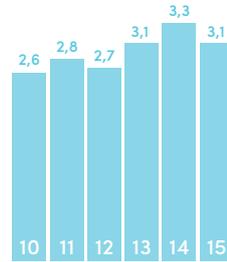
less food per capita was
discarded in 2015 than in
2010.

Amount of food waste measured in tons 2010-2015

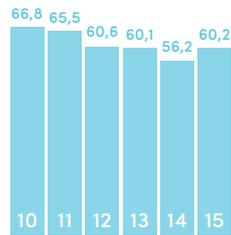
The value below shows the percentage change



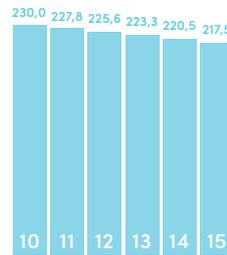
Producers
- 8 %



Wholesalers
+ 16 %



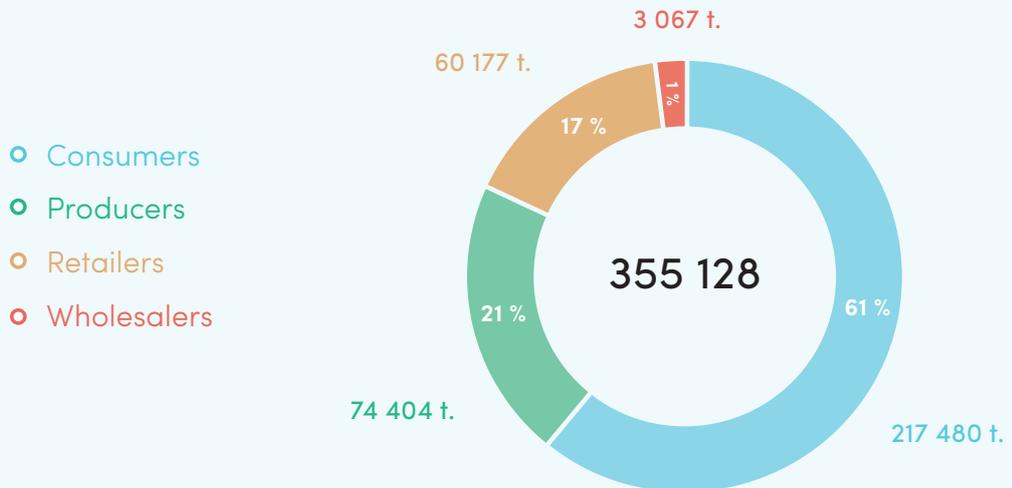
Retailers
- 10 %



Consumers¹
- 5 %

¹ Real measurements are only available for 2011 and 2015, only calculations for the remaining years.

Food waste divided into various joints in the value chain in 2015 (tons)



Producers

Results for producers show that food waste as a percentage of production fell in four of seven product groups in 2010–2015. There were no major fluctuations among the groups. The reduction was greatest for frozen ready-made food and solid dairy products, while dry goods showed the biggest increase. Waste of liquid dairy products was 3.3 % and this is the group with the most waste.



74 404

tons of food are wasted by producers. This equals 21% of total food waste.

8%

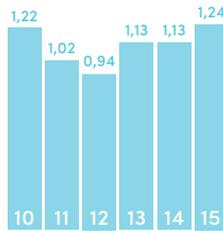
was the reduction in food waste in tons from 2010 to 2015.

7 out of 10

companies reported that food waste efforts are part of their overall business strategy.

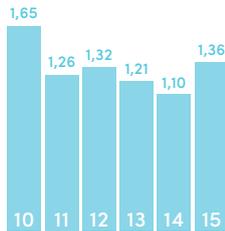
Food Waste as a Percentage of the Production Volume 2010–2015

The value below shows the percentage change



Fresh baked goods

+ 2 %



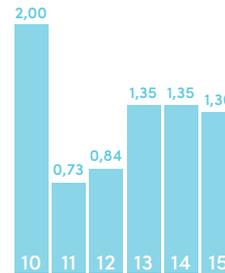
Fresh meat

- 18 %



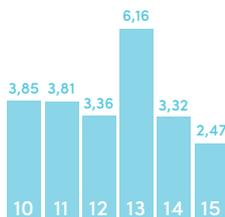
Liquid dairy products

- 28 %



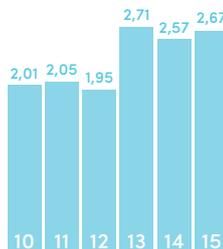
Solid dairy products

- 35 %



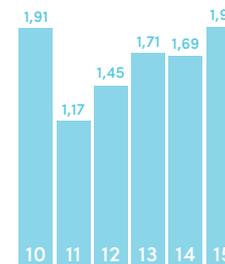
Frozen ready-made food

- 36 %



Dry goods

+ 33 %



Fresh ready-made food and delicatessen items

+ 0,5 %

Wholesalers

Results from wholesalers show that food waste as a percentage of sales value declined for all groups except fresh fruit and vegetables from 2010 to 2015. The reduction was greatest for fresh baked goods, followed by fresh meat and frozen ready-made food. Waste of fruit and vegetables was 1.03 %, and this is the product group with the highest percentage of waste.



3 067

tons of food is wasted by wholesalers.

1 %

of total food waste comes from wholesalers.

“Expired”

is the main cause of waste by wholesalers.

Food Waste as a Percentage of Turnover 2010 - 2015

The value below shows the percentage change



Retailers

Results from the retail stage show that food waste as a percentage of sales value fell in five out of nine product groups from 2013 to 2015¹. The reduction was greatest in eggs, fresh meat and fruit and vegetables, while dairy products and fresh fish showed the biggest rise. Waste of fresh baked goods was 9.4 %, and this is the group with the highest percentage.



60 177

tons of food is wasted by retailers. This is 17% of total food waste.

9 %

fewer eggs were wasted by retailers from 2013 to 2015.

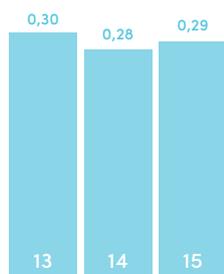
5 out of 10

retail businesses reported having a reduction potential of 10% or more.

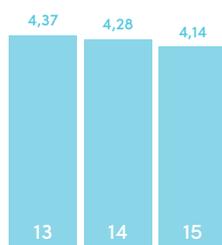
¹ Due to changes in the underlying data (see p. 32), the percentage of waste of sales is only shown for 2013–2015.

Matsvinn as a Percentage of Turnover 2013 - 2015

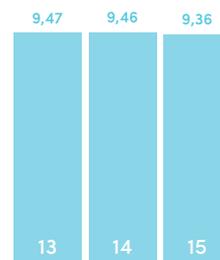
The value below shows the percentage change



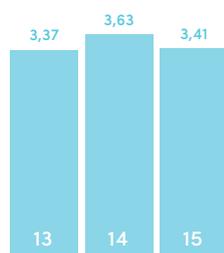
Frozen ready-made food
- 5 %



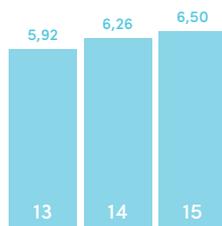
Fruit and vegetables
- 5 %



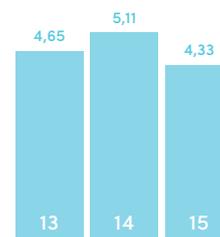
Fresh baked goods
- 1 %



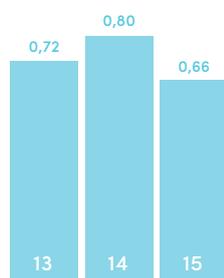
Fresh ready-made food and delicatessen items
+ 1 %



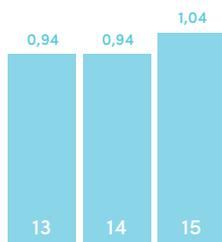
Fresh fish and shellfish
+ 10 %



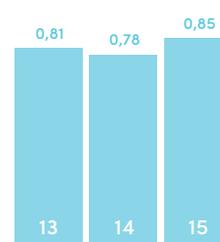
Fresh meat
- 7 %



Eggs
- 9 %



Dairy products
+ 12 %



Dry goods
+ 5 %

Household Waste sample analyses

Results of waste sample analyses¹ show that food waste by consumers fell from 46.3 kg per capita in 2011 to 42.1 kg per capita in 2015, a reduction of 9 % or 4 kg per person. Pan and plate leftovers and fruit and vegetables accounted for most of the waste, while there was least waste in dairy products. Five out of seven groups showed a reduction in waste, which may indicate that ForMat's food waste communication efforts have led to greater knowledge and lower food waste by consumers.



40 %

fewer loaves of bread were
wasted in 2015 than in 2011.

9 %

less food is now thrown away
by consumers.

31 %

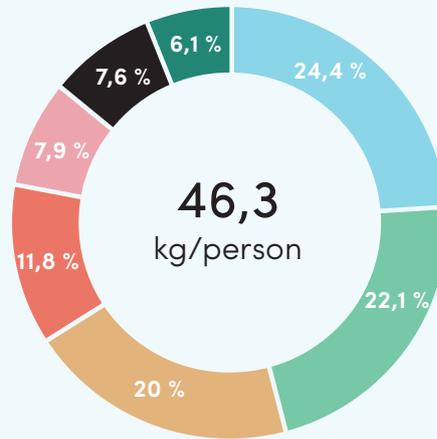
of the food discarded in 2015
was pan and plate leftovers.

42.1 kg

of food was thrown away by
the average person in 2015.

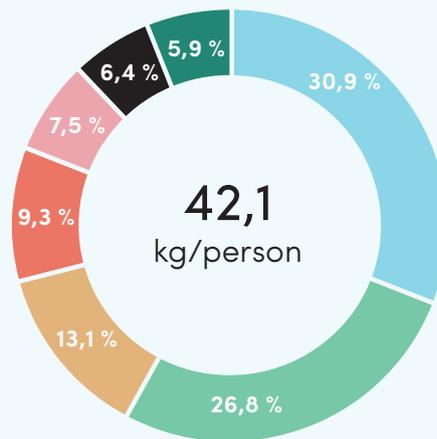
Food Waste per Capita in 2011

- Fruit and vegetables
- Pan and plate leftovers
- Bread
- Other
- Fish and meat
- Other pastries
- Dairy products



Food Waste per Capita in 2015

- Pan and plate leftovers
- Fruit and vegetables
- Bread
- Other
- Fish and meat
- Dairy products
- Other pastries



¹ A waste sample analysis is an analysis of the amount and composition of waste.

Studies of Consumer behaviour & Reasons

From 2010 to 2015, the proportion of consumers who reported having reduced their food waste increased, while those reporting often buying or making too much food decreased. This shows that food waste is on the agenda, and that consumers are becoming more aware of food waste as a problem. «Past its expiry date» is the most frequent cause of food discard, indicating that better planning could have avoided some waste. Poor quality and damaged products are other important reasons. There is little change from 2010 to 2015 in reasons for discarding food.



42 %

of food is discarded because it has passed its expiry date.

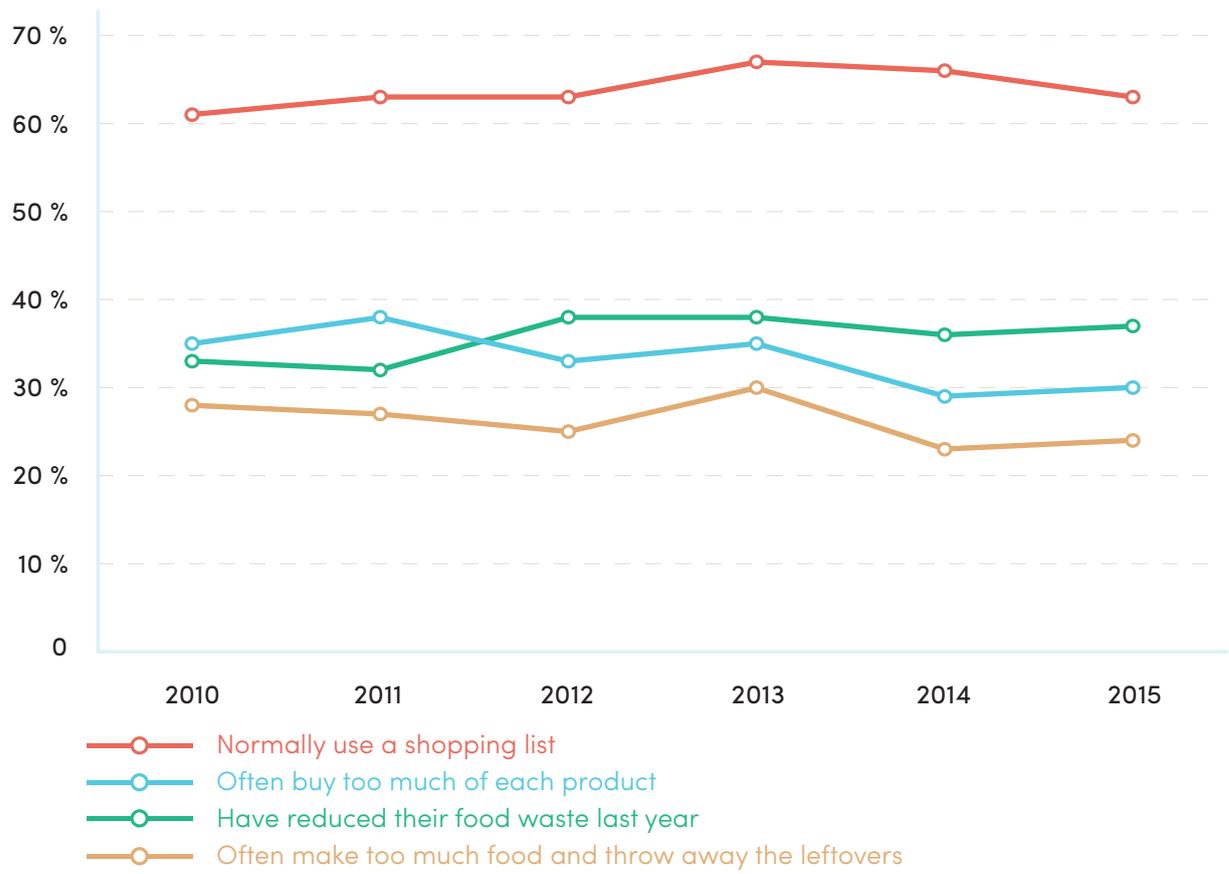
37 %

of consumers say they have reduced their food waste.

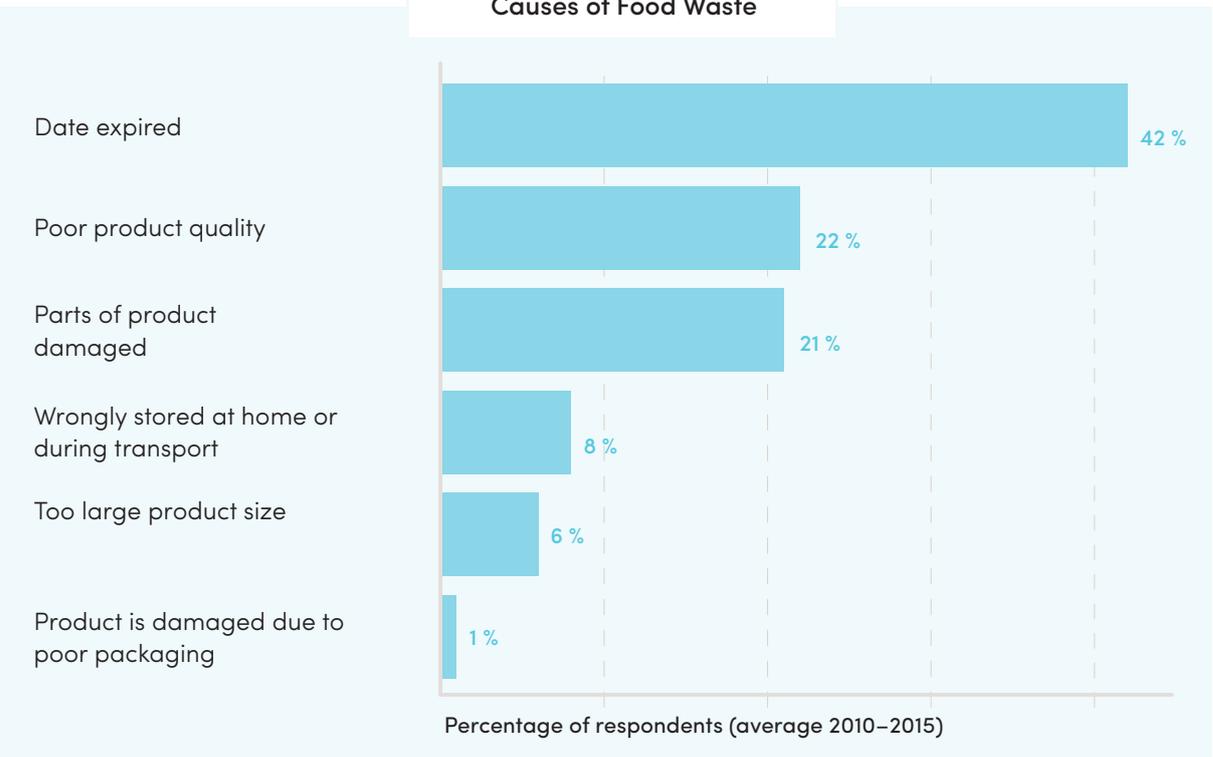
63 %

say they generally use a shopping list and plan their shopping.

Behaviour Related to Food Waste



Causes of Food Waste



Conclusions

Food waste prevention and reduction has been a primary objective of ForMat. The goal at project start was a 25% reduction in food waste by the end of 2015. Although this ambitious goal was not reached, there have been many positive results in terms of increased awareness, actions taken and specific results achieved. In sum, ForMat has made sure that the issue of food waste is on the right track.

Food Waste Reduced by 12%

As the project surveys show, total food waste is now 68.7 kg per capita and fell by 12% during the period. All stages of the value chain showed a reduction in tons, except for the wholesale stage, which only accounts for 1% of total waste. There were no statistics on food waste in Norway before project start, but the amount of food refuse, which includes food waste, increased steadily from 1995 to 2010. This trend has reversed in the past five years. There is reason to believe that the decrease in food waste reflects the efforts of ForMat and the food industry, which has supported the project activities with its own measures.

From Food Refuse to «Food Waste»

It is important to use common concepts in order to measure and compare food waste and to communicate data and analyses. As the term “food waste” was not defined at project start, considerable resources were used to incorporate the correct terminology and communicate the difference between food refuse and food waste. The food industry’s understanding and practice of the concept of food waste has also changed over the period, and several retailers and producers have indicated that their procedures for recording waste have

improved during the reporting period. The definition of food waste has now been established in connection with the letter of intent on food waste reduction, and is the same as the definition in the ForMat project for all stages included in the report.

Necessary Cooperation

Causes of food waste are often found in another part of the value chain; it was therefore important to achieve cooperation between the actors to enable good waste reduction measures. Networks of suppliers and retailers have resulted in a guideline for the industry with methods and tools for food waste reduction, and in a rethink of how the industry divides up the durability period. From the start, the government has provided funding and acted as an observer, and has also during the project period emphasised a public-private partnership as an alternative to a ban to reduce food waste. Cooperation between ForMat and the government has resulted in a letter of intent on food waste, with partners from most of the value chain, where knowledge from the ForMat project will be used to develop indicators and actions in the future sector agreement.

A Common Methodology

Knowledge of amounts and composition of food waste is vital to implement effective and targeted waste reduction measures. The data collected by Ostfold Research on behalf of ForMat is a unique compilation of food waste statistics in a European context, providing valuable information on methods for measuring waste, where in the value chain most food is discarded and what kinds of food, developments over time, as well as the causes of food waste in the various stages of the value chain. Annual survey reports from the project have helped to disseminate this knowledge and the ForMat analyses to a variety of experts and researchers in Norway and abroad.

Important Measures

To create awareness and increase knowledge of the value of food and the economic, environmental and social effects of reduced food waste, ForMat has developed various types of tools and measures during the period, alone or in cooperation with others. The Food Waste Table and websites aimed at the industry and consumers have been the most important tools, in addition to activation of consumers and the industry in social media and at various events. ForMat has had extensive contact with the media throughout the project, with ForMat/Matvett now serving as a knowledge bank for the media on food waste issues.

ForMat has urged the food industry to implement food waste reduction measures. Work by food producers to date label food more correctly has been one of the main results. Since 2010, leading companies have revised the date label to “best before” on a variety of products. This has been important in communicating the difference between “best before” and “use by”, and consumers have been encouraged to use their senses before throwing away food. New packaging technology is another important measure to prolong shelf life, especially for fresh products.

Price reductions on food with a short shelf life help to reduce wastage in stores and are an example of good use of resources. ForMat has played an important part by proposing discounts early in the project period as a suitable measure for retailers. Today, all three chains in Norway offer discounts and to help consumers to find these foods, some stores display them in separate coolers and use different versions of the consumer message “Save money and the environment”.

Collaboration

Most food waste in Norway takes place in Norwegian households (61%), and in order to reach consumers with information and tools, ForMat has achieved successful collaboration with a wide variety of other actors. Ikea, the Consumer Council, Siemens/Elkjøp, and several local councils and waste companies are all examples of partners where collaboration has increased the number of consumers reached.

Research for New Knowledge

Today, food waste is also high on the research agenda. This has been important to provide resources to increase knowledge of methods and best practices in food waste prevention, including communication of these to other sectors, such as horeca and primary industry. ForMat has been involved in different resource teams, either directly or via Ostfold Research. The Nordic research projects on date labelling and redistribution under the Nordic Council of Ministers have been among the most useful projects, with tangible results. “Right Packaging for Reduced Food Waste” (REforREM) is another important project involving the development of new packaging solutions for foods such as tomatoes, sliced meat and sushi.

Satisfaction in the ForMat Network

A survey of satisfaction with the ForMat project among participating food producers, retailers and other partners shows that 8 out of 10 are satisfied with the results of the project. Access to waste data, communication of knowledge to consumers and lobbying the government were particularly highlighted. Matvett has also received feedback on important areas to focus on which will be included in its future work.

The Way Forward

The ForMat project has yielded much knowledge of the extent and causes of food waste in the entire value chain. Food waste is on the agenda and has become an important instrument in environmental and climate policy at home and abroad. This gives Matvett a firm basis for further work on the prevention and reduction of food waste. “Taking care of food” is about protecting valuable financial resources, lowering the carbon footprint and contributing to fairer distribution of food to a growing population.

Preventing food waste is a major challenge in society, and everyone has a responsibility to help ensure that food produced is eaten. This requires long-term, broad cooperation in the entire value chain and with society at large to achieve lasting results. The evaluation of the ForMat project (pp. 28-29) provided useful knowledge to indicate the most important priorities in Matvett’s future work.

A New Framework for Food Waste

It will be important to link food waste prevention to sustainability initiatives in industry and the UN Sustainable Development Goal 12.3, which both the EU and the Norwegian government have pledged to reach:

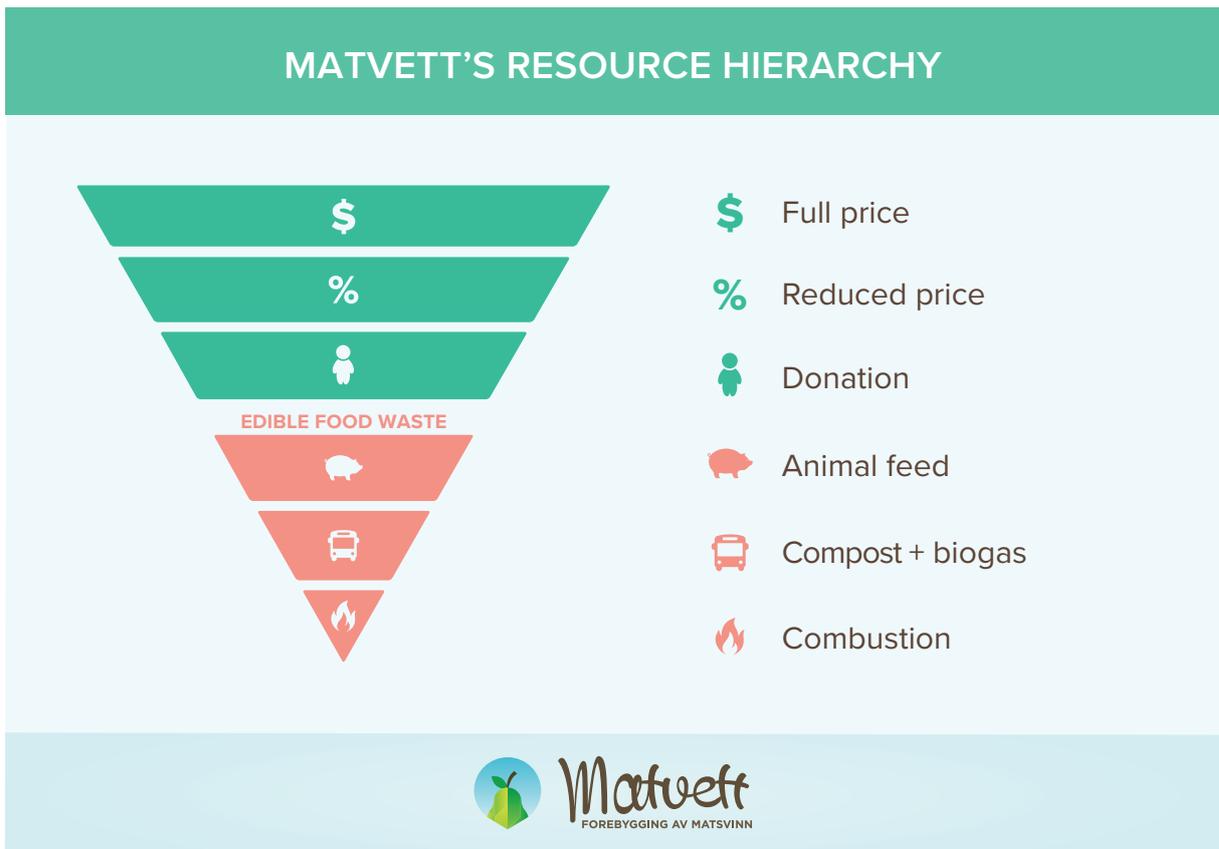
By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

Through various national and international agreements, the government and industry are becoming increasingly committed to working towards a zero-emission society by reducing greenhouse gas emissions to a minimum

and creating carbon-neutral companies and production. World food production accounts for around 30% of greenhouse gas emissions. Since about one-third of the food produced is wasted, food waste alone amounts to 10% of total emissions. Food waste prevention is one of the lowest hanging fruit to address CO2 emission reduction: examples are the development of products with longer shelf life, packaging solutions that preserve food better, better circulation of items in stores and discount schemes for food with a short shelf life, more suitable servings for guests in hotels and restaurants and raising consumer awareness through campaigns and educational materials.

Organisation of the Work

Matvett in 2016 is the food waste prevention and reduction initiative of the food and catering industry, owned by NHO Food and Drink, the Grocery Producers of Norway, the Norwegian Grocery Sector’s Environmental Forum and the Norwegian Hospitality Association. The company currently has two employees. As the catering industry has also been part of Matvett’s work since 2015, Matvett will also focus on identifying and reducing waste in hotels, restaurants and canteens.



This resource pyramid is Matvett's most important tool to demonstrate good use of resources and how the various actors should work to ensure that food is handled as high up in the pyramid as possible.

The content and distribution of resources in the sector agreement on food waste between the entire food supply chain and the government will affect Matvett's organisation of its future work. This agreement, based on a letter of intent from May 2015, is expected to be signed in the first quarter of 2017. Matvett is leading efforts to draw up proposals for measures for the food industry and the government to pledge to implement in order to achieve common food waste reduction targets in Norway.

Role and objectives

To achieve sustainable food culture in Norway, knowledge of food and awareness of food waste must be enhanced, especially in school pupils, and in all parts of the private and public sectors that deal with food. The environmental impact and use of resources on the journey from farm to table must be highlighted.

Maximum utilisation of food produced must be ensured. Against this background, Matvett has drawn up its strategy until 2020. It will be vital to assume the role of a driving force and disseminator of knowledge to ensure that actors in the value chain prevent and reduce food waste in their own business and in networks. Matvett's goal will be similar to that decided in the sector agreement, probably in line with the UN sustainable development goal mentioned above.

Matvett, representing the food and catering industry, working with other major actors in society, can help the government to realise its national and international commitments by developing and implementing good prevention strategies, structural changes, effective measurement tools and actions that make a difference to food waste.

A Big Thank You to our Supporters!

One of the success factors of the ForMat project has been the extensive cooperation between the food industry, the government and other actors in society. All those mentioned below deserve a big thank you for helping to put food waste on the agenda and lay the foundation for further work on food waste in Norway.

The ForMat steering committee has been an important resource team and an important discussion partner for management. It consisted of members of the owner organisations and supporters:

- Thomas Weihe and Line Gaare Paulsen, DLF
- Roar Getz and Jens Olav Flekke, DMF
- Knut Maroni and Jorunn Vormeland, NHO Food and Drink
- Ole Jørgen Hanssen and Aina Stensgård, Ostfold Research
- Therese Hagtvedt, Nofima
- Kari Bunes, NOK/DNE (packaging organisations)
- Per-Hallvard Eliassen, Ministry of Agriculture and Food (observer)
- Ragnhild Bjørke, Ministry of the Environment, and Elisabeth Møyland, Environment Agency (observers)

The board of Matvett has led the Matvett management in the implementation and completion of the ForMat project:

- Knut Maroni and Gaute Lenvik, NHO Food and Drink
- Helge Hasselgård, DLF
- Jens Olav Flekke, DMF

A great many food producers and retailers have been involved in the ForMat project since 2010, contributing to the project work and providing financial support.

A total of 32 food and beverage manufacturers have signed a voluntary agreement on financial contributions to Matvett/ForMat; this has been decisive for the implementation of the project and to ensure a long-term perspective:

Nortura, TINE, Bama, Diplom-Is, Synnøve Finden, Stange Gårdsprodukter, Kjeldsberg Coffee, Baxt, Korn, MaxMat, Spekeloftet, Norsk Kylling, Coop Norge Handel, Coop Kaffe, Røra, Friele, Joh. Johannson Coffee, Mondelez,

Barilla, Mills, Kavli, Nestlé, MatBørsen, Dr.Oetker, Lerum, Unilever, UNIL, Hennig Olsen, Maarud, Q Dairies, Den Stolte Hane and Coop Frukt & Grønt.

Other supporters in the food sector were NorgesGruppen, Kiwi, Meny, REMA 1000, Asko, ICA Norge and Coop Norge.

Government ministries have supported the work with annual grants since 2010. This has been crucial for the development and implementation of waste reduction measures aimed at the food industry and consumers:

- Ministry of Climate and Environment
- Ministry of Agriculture and Food
- Ministry of Children, Equality and Social Inclusion
- Ministry of Trade, Industry and Fisheries

Other partners

- LOOP
- Into Life
- Green Living
- The Future in Our Hands
- The Consumer Council
- Siemens/Elkjøp
- Oslo Agency for Urban Environment (Line Tveiten)
- Oslo REN (waste company)
- Asker Town Council
- HIAS (waste company in Hamar and district)
- BIR (waste company in Bergen)
- RIG (waste company in Grenland)
- The Christian Democratic Party (MP Line Henriette Hjemdal)
- Dinamo Publishers (Ottar Samuelson)
- Sara Døscher, author of "Loving Leftovers"

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