

Development of Climate Choice Lunch concept for restaurants based on carbon footprinting

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ABSTRACT

A concept for communication of climate impacts of lunches was developed in Finland. The criteria for a Climate Choice Lunch concept were created in a stakeholder dialogue and three restaurant operators piloted the concept in 25 restaurants in spring 2014. The pilot was based on simplified carbon footprint assessment of 105 ordinary lunches, consisting of around 200 different ingredients. Quantitative assessment was made to understand variability and reasons of plate level climate impacts and to set up quantitative criteria, maximum limit, for a Climate Choice Lunch. Other sustainability criteria were also included in the concept. The pilot confirmed that to promote climate-friendly eating a long-term concept, instead of a short campaign, is needed. There is interest among consumers and restaurants for climate impact information on food. Lunch is regarded as a good opportunity for consumers to learn about climate-friendly eating. The main challenge is to produce sufficient reliable background data.

Keywords: carbon footprint, communication, consumer, eco-design, stakeholder dialogue

1. Introduction

A quarter of climate impacts of consumption come from food production and its consumption (Seppälä et al., 2011), yet consumers do not have enough information or sufficient understanding to make climate-friendly choices about food (Hartikainen et al. 2014). The most significant reductions in greenhouse gas emissions for food consumption can be made at the diet level. Reducing consumption of meat, eating seasonal foods and eating according to energy needs are key issues. Not all the responsibility can be placed on consumers, but they could play a significant role by making informed choices that are good for the environment and their health.

Consumer communication of climate impacts of foods should be made very simple, but challenges are substantial and consumers do not perceive food consumption as being a significant source of environmental impacts, particularly regarding contribution to greenhouse gas emissions (Hartikainen et al. 2014). Therefore, the Climate Lunch project (2013-2014) was established with two specific aims: to raise consumer awareness of climate impacts of food and to concretize the features of climate-friendly food portions and ingredients. The project aimed to decrease the climate impact of Finnish lunches significantly by offering a climate friendly lunch alternative to Finnish consumers, and indirectly by educating them about climate friendly food choices in general.

During the project, a concept of a Climate Choice Lunch was developed and tested in co-operation with pilot restaurants. The project defined, in close co-operation with stakeholders in the Finnish food sector, a set of criteria for the Climate Choice Lunch based on reliable and unbiased scientific information that are sufficiently ambitious enough in terms of reducing climate impact. This concept is significantly different to other campaigns on climate friendly eating in that the maximum limit of climate impact for Climate Choice and Better Climate Choice were defined and also other sustainability and nutritional criteria were considered. Efforts were also made to make sure that all the criteria would be acceptable to all stakeholders in the Finnish food sector.

Additionally, the concept of the Climate Choice Lunch aimed to be simple enough to be easily integrated into the current production systems of Finnish restaurants and cause minimum extra work to the restaurant staff. Developing the concept balancing between scientific precision, simple consumer communication and practicality for service providers has been crucial.

2. Defining criteria for Climate Choice Lunches in a stakeholder dialogue

The planning started with a review of initiatives, campaigns and concepts related to climate impacts of ready meals and lunches. Nothing similar to the planned concept was found, but different types of campaigns were found, including 'Meatless Mondays'. In particular, no information was found on the successfulness or lessons learned from different initiatives. Closest to the planned concept was a project in Finland, in which one of the

restaurants that participated in the Climate Lunch project had also participated a few years ago and in which a one-week climate friendly lunch campaign was staged. The recipes were not evaluated and the climate friendliness was only assumed by offering seasonal vegetables and vegetarian and fish meals.

A second review was made of methods to evaluate additional sustainability aspects of food. It was noted that no meal should be promoted that could be considered a non-sustainable choice in another impact category. Therefore, nutritional and other sustainability criteria were reviewed. Mainly issues of social responsibility, such as animal welfare, working conditions, product safety, and environmental impacts (eutrophication and acidification) were looked at, but we did not find enough information to make justified exclusions of specific ingredients. It was also noted that there are insufficient easily-available, science-based criteria for animal welfare, working conditions etc. It was also seen that animal welfare could conflict with climate impact. Product safety in Finland is already well developed and was not necessary to include as a criterion. It was also considered if fair trade products should be recommended, but it was not seen as a relevant criterion for climate friendly concept. Regarding other environmental impacts, such as eutrophication and acidification, there are not enough data in the literature to estimate them qualitatively.

Through a stakeholder dialogue with restaurants, government, health organizations, environmental organizations etc., consensus for inclusion of criteria for climate-friendly lunches other than for climate and carbon footprint maximum limit were set. First, results of the review were presented to the project's steering group. Afterwards a stakeholder workshop was held for 23 participants to comment on and accept the steering group's choices on criteria other than for climate and to define target maximum limit for climate impact of climate-friendly lunches. A simplified carbon footprint assessment formed the basis for the stakeholder discussions on the quantitative climate impact maximum limit of the Climate Choice Lunch concept. Voting on the target maximum CO₂-eq. limit, different stakeholders exhibited differing preferences on the ambitiousness. The restaurants and food industry were much more careful in setting the reduction target than were NGOs, which were more courageous. Ultimately, the project steering group suggested two levels for labeling, (standard) Climate Choice and Better Climate Choice. Two levels of labeling were seen as being more complex for consumers, but were acknowledged as being crucial to the concept, being both credible and ambitious enough in the eyes of environmentally aware persons while, being of general interest (for people who want to eat at least some meat). Milk and bread were always fixed in a meal according to national public mass catering guidelines and restaurants have only few possibilities to affect their climate impact. Therefore, the limits for the lunches were defined for the meal components for which restaurants can make significant changes to recipes and thus to climate impacts: main course, possible side dish (pasta, rice, potatoes etc.) and side salad.

Final decisions were made in the steering group after the workshop. The limit for the Climate Choice Lunch was defined as 15% less emissions than an average lunch, which means it can still include at least some meat, and for the Better Climate Choice Lunch at 30% less emissions than average. This means that the maximum climate impact of a Climate Choice Lunch is 0.65 kg CO₂-eq./main course and side salad, and for a Better Climate Choice 0.8 kg CO₂-eq./main course and side salad, based on the quantitative assessment of climate impact of lunches presented in chapter 3. Thus, the Better Climate Choice Lunches were almost all vegetarian, except for some herring, pollock and salmon dishes. Climate Choice Lunches were also mainly vegetarian, with some fish dishes and a few pork or broiler dishes. Generally speaking meat dishes needed to have a side salad with a lower climate impact than average salad and relatively less meat and more vegetables to have a climate impact below the threshold.

Finally, WWF's sustainable fish list and national public catering nutritional recommendations applied as minimum criteria for the concept. The public recommendations define a nutritious meal and they include a glass of milk or sour milk with the meal. Because of the relatively high climate impact of animal products, the inclusion of milk was greatly discussed, but in the end a glass of milk was included in the concept in line with the recommendations.

3. Quantitative assessment of climate impacts of lunches

In the planning process of the concept it was already clear that greenhouse gas emissions for all ingredients from different production systems and countries, as used by the restaurants involved, could not be estimated in detail. Therefore, a simplified carbon footprint assessment was conducted based on MTT's previous Life-Cycle-Assessment (LCA) studies and literature reviews, and new scientific literature.

There was no intention to study the precise greenhouse gas emissions of a specific lunch meal based on particular LCA guidelines, but the order of magnitude of different types of lunches and the contribution of different ingredients to total climate impacts of meals was sought. The estimation would serve at this point only to enable development of the Climate Choice Lunch concept, its criteria and incentives, and piloting of the concept for one week.

The main criterion of the concept being climate impact, it was crucial that it be based on as reliable background information as possible. However, it is clear that the comparability of climate impact results from different studies and different products are not directly comparable. The lack of comparability and harmonization creates challenges and limitations for communicating initiatives such as this concept. The best available and applicable data from previous carbon footprinting projects were used, a few data gaps were filled and where regarded as important, a few production systems and average regional and or seasonally adopted estimates were created (such as for tomato, cucumber and salad production in south, central and northern Europe in winter).

Impacts of 105 lunches from three types of lunch restaurants were estimated, comprising around 200 different ingredients. The emissions were estimated for each restaurant's one-week menu and mainly for the raw-material production of ingredients in the recipes. They could be unprocessed raw materials, such as uncooked and unpeeled potatoes, or readily processed and cooked ingredients, such as fish fingers.

As the major share of a meal's climate impact comes from its primary production and due to limited resources of the project, mainly emission figures readily available in LCA literature, such as those from agricultural stage and input production (energy, fertilizers etc.), were included in the assessment.

As figures for processing, transport and storage were not always included in the studies available, they were not systematically included. In the case of processed ingredients, the original recipes were assessed so as to assess the actual amount of raw materials used (wheat, sugar, vegetable oil etc.). Generally, no emissions from the processing stage were included. Production losses were not taken into consideration systematically, even though they can have significant influence. Yet, because of its significance, values for the yield of processing stage of meat were included, and thus boneless meat was considered in recipes. Production losses when cooking meat (water loss) were also considered when restaurants used cooked ingredients in their recipes. In addition, it was known that emissions from processing and cooking in restaurants would be significant, but the restaurant sector does not currently record enough information on the corresponding energy consumption, which would have been allocated differently for different lunch meals.

The estimation was not made according to real consumption data of consumers in different restaurants, but to allow comparisons of different meals from different restaurants, estimations were in line with the standardized meal composition as defined in the Finnish public catering nutritional recommendations (Ministry of Social Affairs and Health 2010). Therefore, a meal included a main course (400g of soup, 300g of casserole, 150 g of meal sauce or 120 g of meatballs or fish or equivalent + 30 g of sauce), with a side dish (100 g rice, 150 g potatoes or 120 g pasta, all weights as boiled), 200 g of side salad, 30 g slice of bread (or two if main course was soup), 5 g of margarine per slice of bread and 170 g of milk. The recommendations also defined minimum fiber and vegetable intake per meal, and maximum total and saturated fat and salt intake per meal.

The climate impacts of complete meals ranged between 0.6-2.8 kg CO₂-eq. per meal, the average being 1.21 kg CO₂-eq. per meal or 0.95 kg CO₂-eq. per main course and side salad (some examples are given in Figure 1). According to the results, the climate impacts of main courses and side salads varied greatly. The largest impact of a main course was almost 20-fold compared with the smallest. The largest burden of a side salad was four-fold in comparison with the salad with the smallest burden. On average, a main course caused 45% of the impact of a meal, a side salad almost 30%, milk 20% and bread less than 10%. According to the results, differences in different lunch plates were large. By composing a meal differently, or even only changing the recipe of the main dish or side salad, climate impact could be decreased significantly without compromising nutrition.

Vegetarian meals usually had significantly lower emissions than the average meal. However, the climate impact of some meals that included a lot of cheese, cream or northern European vegetables grown in greenhouses during winter, were above the average. Fish main courses generally had low impacts, except for a few salmon dishes. Whether a fish meal was below or over the average depended greatly on the impacts of the side salad. The emissions of meat dishes were at or above the average. Moderate meat consumption as a part of well composed meal can keep the burden to the average level. For example, a pork stew with a side salad, which has low climate impact, can be below the average. Also the burden of pasta with mincemeat sauce can be average or very high depending on the type and amount of meat.

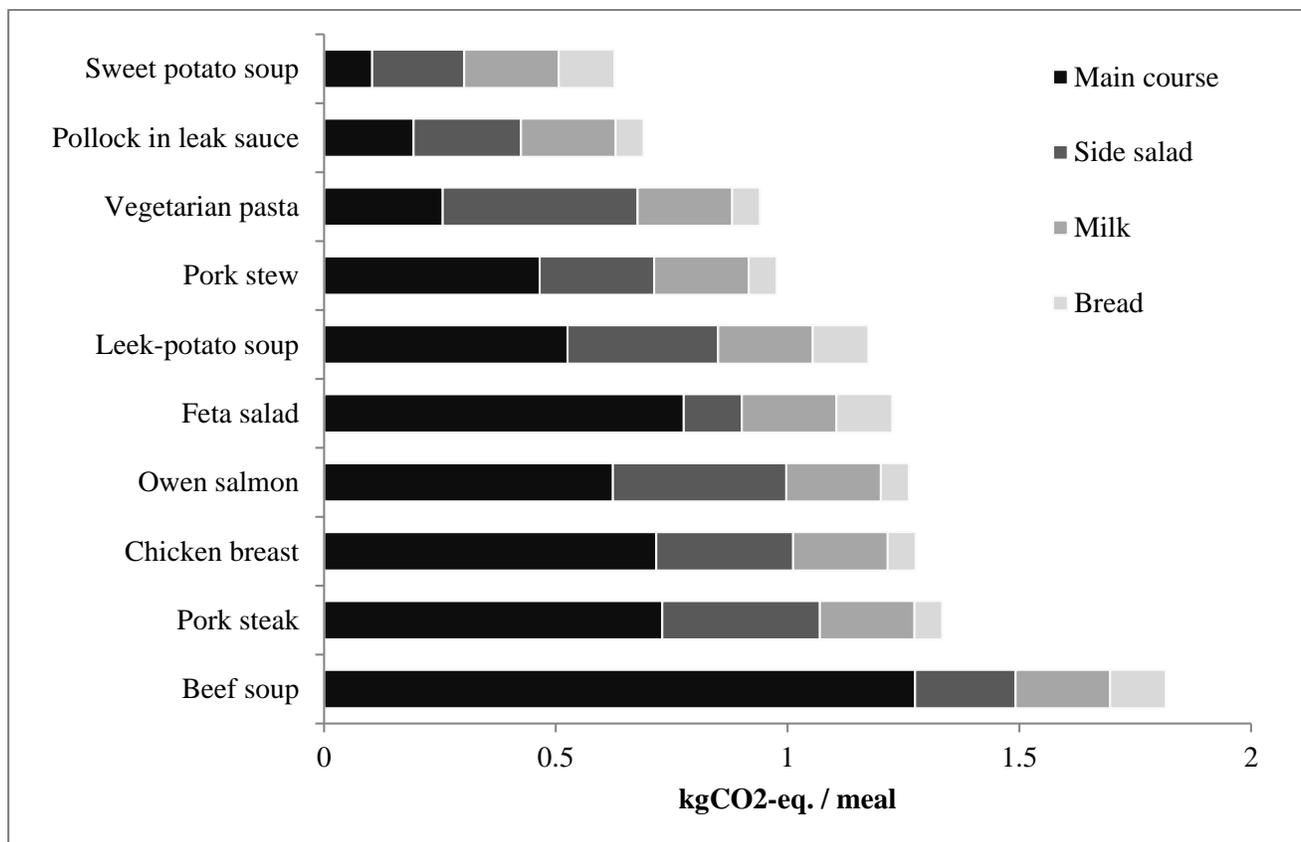


Figure 1. Examples of climate impacts of lunches.

4. Piloting the Climate Choice Lunch concept

To ensure practicability and to pilot the developed concept, three types of restaurants were included in the process. All restaurants offered a buffet lunch with 3-6 options per day, including at least one vegetarian option. Two of the 25 restaurants were office canteens, on the premises of an industrial company and one a canteen of an environmental institute. One restaurant was a public canteen for mainly office workers and students and this was the only one outside the main metropolitan area of Helsinki. The three were part of the leading Nordic catering company. One restaurant was a high quality but small restaurant of a catering school already committed to the Nordic Swan environmental label. The remaining 21 restaurants belonged to the same chain of canteens for students and offered government subsidized lunches.

The restaurants offered the project lunch recipes over a typical week. Based on the initial assessment, most of the restaurants needed to make changes in their recipes to lower climate impacts of their meals and to have Climate Choice and Better Climate Choice lunches available on their menus every day. Restaurants planned their own communications (both on-site and on the Internet) of the pilot weeks based on a common layout, logo (see Figure 2) and slogan developed in the project. After the pilot stage, restaurant staff gave valuable feedback on the practicality of the concept.

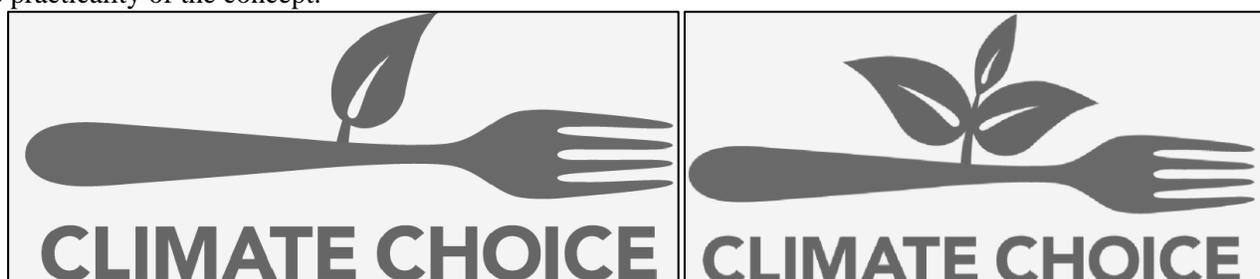


Figure 2. Logos for Climate Choice (one leaf) and Better Climate Choice (three leaves) lunches.

The starting point of the project was that most consumers do not have sufficient understanding to make informed climate-friendly decisions, which has been discovered in the earlier projects of MTT. Therefore, simple, label-based communication was considered the best way to communicate the issue to most consumers. Most of the restaurants differentiated Climate Choice meals from other meals by labeling them in the buffet. Only one restaurant marked Climate Choice Lunches solely on the menu available at the buffet. In addition, some restaurants informed about the Climate Choice Lunch week on tables where clients ate and in posters around the restaurant. Some restaurants also labeled their menus on the Internet.

The aim of the consumer studies was to have information on consumers' first impressions of the concept: if they liked the idea or not, why they chose Climate Choice Lunch if they did and whether they would choose it again. Consumer studies were conducted in two simple ways. A one page paper survey was available to be filled in voluntarily in restaurants on Thursdays or Fridays, after four or five days of the pilot phase. In total 307 paper responses were received. In addition, on Wednesdays and Thursdays of the pilot week, 33 interviews were carried out in 4 different restaurants. A short electronic survey was conducted also among restaurant staff about their experiences on the concept and the pilot week.

The concept was tested in 25 restaurants in spring 2014. The motivation of restaurant staff to ensure survey responses from consumers was very important, and in this project it was successful in some restaurants but not all. Therefore, not as many responses were received as hoped for.

Based on the 33 interviews, only around 50% of customers seemed to notice the pilot of Climate Choice Lunch. Information given on the tables where people were eating seemed to be the most efficient means of communication and that information was registered best when put on tables two weeks before the pilot week. A few consumers actually stated they were too hungry and busy when they are queuing to notice information at that stage. Labels that were placed on the buffet, where people choose their main course and which was thought to be the most noticeable and important site for communication, were actually noticed the least. Some people noticed the labels on the menus before the buffet. Very few customers noticed that there were two levels of Climate Choices. Customers also automatically thought that all vegetarian meals would be climate friendly: many people that had chosen the vegetarian meal thought that they would have opted for the Climate Choice, even if that was not true.

It seemed that during a short campaign as represented by this pilot phase, people who reacted quickly to communication (here the label) and chose the climate-friendly lunch, did so because they already thought about the environment when making decisions on consumption. Few customers acknowledged that the idea of thinking about climate impacts during lunch was new to them, even though they might have thought about it when grocery shopping. Consumers who had noticed the campaign, and were probably more environmentally aware, wanted more information on why specific lunches were Climate Choices. Even if the sales of Climate Choice meals did not increase compared with a reference week, consumers felt positive towards the concept, and thought it gave them information in a very simple way and which they could use to make better choices.

The 307 paper responses indicated that the most important criteria for choosing a meal in general were the attractiveness and expected taste of the dish. It was clear that consumers, who chose a Climate Choice Lunch, chose it because of expected healthiness of the meal more often than for environmental reasons. Even though the criteria of Climate Choice Lunches included health criteria, it should not be expected that consumers had learned that in a one-week period. 40% of the 307 respondents in the paper survey stated that they would choose a Climate Choice Lunch at least often, if not always. 54% stated they would choose it at least every now and then.

Restaurant staff seemed to feel very positive about the new concept. Extra work is needed mainly from the staff that plan the new recipes, but others did not seem to mind the little extra work as most were interested in and felt engaged with the concept.

4. Discussion

Even though an approximate climate impact assessment of ingredients was made, it is apparent that more detailed and comprehensive carbon footprint databases are needed for restaurants to evaluate and design lunches. Creating a reliable and harmonized database for a credible concept remains a challenge.

Some secondary data can be collected with rather limited resources from the literature and databases but validating, harmonizing, filling the data gaps and reporting data requires multiple efforts. 50% of the lunches varied between 0.94 and 1.37 kg CO₂-eq./meal. The range shows that the definition for whether a lunch is climate-

friendly or not is very sensitive to even small changes in the amounts of ingredients or changes in the ingredients themselves. Therefore, it is crucial that a credible future concept relies on good quality carbon footprint data based on scientific and objective research.

Not only harmonization of methodologies used in different studies, such as allocation and consideration of local production circumstances, including soil types, but also system boundaries and practical calculation procedures (e.g. energy consumption of field machinery) need to be harmonized. Also more life cycle stages, such as processing and freezing and in particular raw material losses, should be added. Uncertainties and variability should be assessed to make reliable differentiations between climate-friendly and other lunches. In addition, data have to be transparently reported provided to any stakeholder who wishes to verify them. Only then a future low-carbon meal concept can be reliable. This kind of research should be conducted objectively, but with a focus on the largest contributions and the most uncertain estimates so as not to be too overwhelming.

Recipes and menus change often and in the future databases for climate impacts of ingredients and processing should be integrated with restaurants' recipe software. Such software already assesses, for example, nutritional values and it would be most practical for restaurants that the same program would assess climate impacts. Hence, restaurants could use such a program as an eco-design tool for meals and could verify their communication with it.

It would be good to include energy consumption for cooking and losses during processing in a concept like this because it could provide relatively interesting information for consumers when choosing their lunch restaurant or for differentiating between differently cooked meals. It would however require that more information on energy consumption and losses from food processing would be available to enable fair comparisons to be made among restaurants using different shares of raw materials (such as vegetables) and processed ingredients (vegetable steaks), which consume energy and create waste streams during different stages. According to one small Finnish study including very few restaurants, the energy and heat consumption of different restaurants can vary between 0.5-2.3 kWh/meal. Using average Finnish electricity and heat production emission factors, the greenhouse gas emissions would vary between 0.2-0.6 kg CO₂-eq. per meal. The largest energy consumption was measured for an à la carte restaurant, and the smallest one in a school canteen. For an average public restaurant adopting the Climate Choice Lunch concept we could estimate the value to be around the average. As losses can be significant and directly cause direct increases in emissions during raw material production, it appears that the impacts of both energy consumption and losses are significant at the meal level and should be taken into consideration in the future in developing such concepts, but for the time being it is not feasible for restaurants to collect the necessary data nor to differentiate among meals.

The consumer study results should be considered in the light of this kind of concept being unlikely to succeed as a short campaign, but perhaps being much more successful as a permanent feature of a restaurant. Therefore, the learning aspect would increase slowly and people would come to understand more about the information provided. Currently the two levels of Climate Choice Lunches were not recognized as wanted. Moreover, some of the customers who showed interest in the concept regarded the simple information as deficient, and they would have preferred more detailed information.

It is hard to communicate climate impacts of lunches to consumers when most consumers do not consider food and agriculture as being significant sources of environmental impacts, not to speak of climate impact. Even when environmentally aware consumers think about environmental impacts of foods, they might think about them when they are grocery shopping for home cooking, but not when eating lunch in a restaurant. It is necessary to emphasize to the consumers that lunch choices can be a good and simple way to influence the climate through a concept like this. It is understandable that this kind of concept would take a longer period than a week to become noticed and increase understanding significantly, and subsequently affect consumer behavior.

It is obvious that most of those who would choose a Climate Choice Lunch currently would do it either for health reasons or because they are already vegetarians and would anyway choose a vegetarian meal for animal rights concerns. Therefore, emission reductions could also be achieved by educating restaurants in provision of climate-friendly vegetarian meals. Climate friendliness and healthiness could then go hand in hand, e.g. reducing the amount of cheese and cream consumed and increasing the amount of beans and lentils. However, to make vegetarian dishes more attractive to others than vegetarians, and to show them that vegetarian meals can be tasty, cream and cheese are often used. To be able to develop a concept where some animal-based products can be used and dishes made attractive to all, climate impacts need to be estimated with good reliability rather than be

based on a simple list of high and low impact ingredients, which would lead to vegetarian meals being the sole climate-friendly options.

As some consumers said, information on climate impacts of meals can have an impact on the buying decision when two alternatives are otherwise equal. Therefore, climate-friendly lunches have to be made attractive, in particular, if they do not contain meat.

5. Conclusion

Consumers need to be given simple ways to affect the climate burden of their consumption. Small changes, like choosing one of the two Climate Choice Lunches a couple of times a week, can directly decrease climate impacts of food consumption significantly. In addition, consumers can start to learn slowly what climate-friendly eating actually means. The pilot project confirmed the idea that promoting climate-friendly eating in a campaign is not enough, a long-term concept is needed.

Lunch represents a challenge, but if successful could represent a very successful opportunity to communicate climate impacts of foods to consumers. It is hard to make people notice communications in a restaurant when they come there hungry and busy, but as so many people eat lunch in a canteen every day, it could represent a very efficient way to inform consumers as they are likely to be open for new information in canteens. The first step would still be to make ordinary consumers think and talk about climate change and to bring the subject closer to consumers.

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