

# SCHOOL MEALS 2030

## HOW TO HALVE THE CLIMATE IMPACT

School Meals 2030 experiment

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EXAMPLE MENU INCLUDED



The practical experiment was carried out in 2019–2020 with the support of the Ministry of the Environment as part of the Kokeilun paikka climate experiments. The activities in 2020 were conducted in cooperation with the research project Just Food ([justfood.fi](http://justfood.fi)).



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# SCHOOL MEALS CHANGE THE WORLD

In terms of the climate impact of human activities, 25-30% is attributable to food<sup>1</sup>. That is why reducing the climate impact is important. We need to start favouring alternatives that burden the climate less, i.e., climate-smart food.

In Finland, c. 900 000 children have access to free warm and nutritionally well-balanced school meals, and they eat one of their daily meals at school every school day. The climate actions of school meals therefore have a big impact!

School meals support a sustainable food revolution by increasing the awareness of climate-smart food and by introducing children to new flavours and ingredients. School meals can therefore transform the food culture and eating habits at an age that has an effect throughout life.

In Finland, school meals also have an important pedagogical purpose. The food education provided through school meals can:

- › encourage pupils to favour climate-friendly solutions
- › improve the understanding of the environmental impact of food
- › affect pupils' impressions of tasty, nutritious food.

This informative brochure describes ways to halve the climate impact of school meals and the practical lessons learned from research conducted on climate-smart food and practical experiments. The brochure also contains climate-smart recipes that have been well-tried as school meals. The recipes have been created by professionals at Service Centre Helsinki and the catering services of Muurame.

The six-week example menu illustrates what a school menu with half the climate impact could look like. The menu fulfils the nutritional recommendations and its costs are acceptable.

<sup>1</sup> IPCC, or the Intergovernmental Panel on Climate Change  
[www.ipcc.ch/site/assets/uploads/2019/08/2f.-Chapter-5\\_FINAL.pdf](http://www.ipcc.ch/site/assets/uploads/2019/08/2f.-Chapter-5_FINAL.pdf)



**Finnish and local foods are favoured in the menu. The menu can be introduced gradually so that it will be fully implemented by 2030 and the emissions of school meals will be at least halved.**

# CLIMATE ACTIONS IN AN INSTITUTIONAL KITCHEN

## IT'S ALL IN THE INGREDIENTS

80% of the climate impact of food is attributable to primary production, i.e., agriculture and fishing. Thus, processing, packaging and transport only have a minor effect on the emissions, especially with regard to ingredients that place the greatest burden on the climate. The impact of transporting grains and potatoes is quite high, because the carbon footprint of the ingredient itself is so small.

There are major differences between ingredients (Figure 1). In fact, the greatest climate action is to replace the most climate-burdening ingredients with more climate-friendly ones:

- › by revising existing recipes
- › by replacing the most climate-burdening accompaniments and side dishes, such as rice, cheese, meat pastry etc., with more climate-smart ones
- › by increasing the range of available low-emission vegetarian foods and sustainably caught freshwater fish.

## FOOD WASTE

Reducing waste is an important climate action. However, the climate impact of waste depends on the climate impact of the food. That is why the temporary increase in waste that results from trying out new, climate-friendly foods should not be feared: even the waste of climate-smart food burdens the environment less and the volume of waste will normalize in the long run as consumption evens out, and the supply and demand of the new foods become balanced. In a Swedish study<sup>2</sup>, a climate food interven-

## Climate Impact of Foods

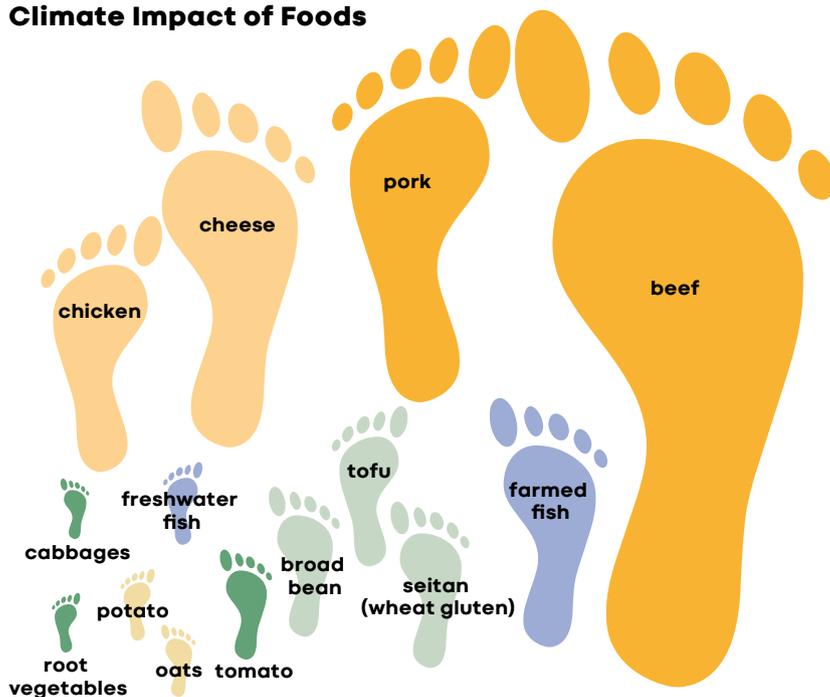


Figure 1. Relative climate impact of various foods. The calculation is based on an extensive comparison of research data in 2019 as part of the School Meals 2030 project.



**A well-tryed method to reduce waste is to sell the excess food at a low price immediately after the meal. Some waste foods can also be served the next day, giving the pupils more options to choose from along the serving line.**

tion was carried out at a school, and a menu where the emissions were almost halved was not found to have a significant impact on food consumption or waste or customer satisfaction.

<sup>2</sup> Colombo et al. 2020: Sustainable and acceptable school meals through optimization analysis: an intervention study. [link.springer.com/article/10.1186/s12937-020-00579-z](https://link.springer.com/article/10.1186/s12937-020-00579-z)

# CLIMATE COMPARISON OF SCHOOL MEALS

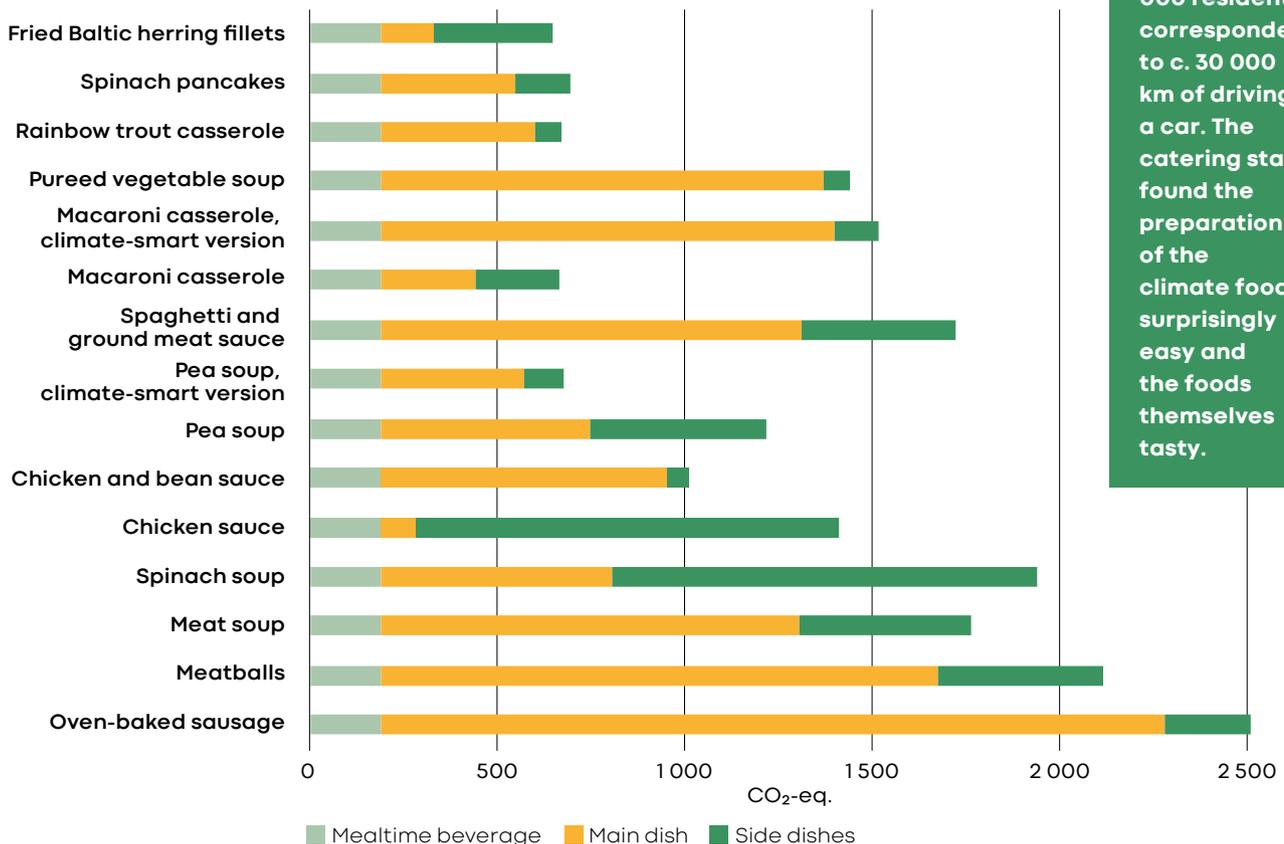
Climate work requires a good overall understanding of the effectiveness of various climate actions. Climate calculators are being developed for the Enterprise Resource Management (ERP) systems to support climate actions in the future.

In Muurame, the climate impact of the full school menu was calculated in 2019 using the average values compiled from scientific data and, whenever possible, also the data that explicitly concerns domestically produced foods.



The emission reduction during the climate theme week in Muurame, a municipality with roughly 10 000 residents, corresponded to c. 30 000 km of driving a car. The catering staff found the preparation of the climate foods surprisingly easy and the foods themselves tasty.

## Climate Impact of Meals



# FROM AWARENESS TO ACTION

## CLIMATE FOOD WEEK

The theme week introduces pupils to climate meals and provides catering with lessons for future development. The week should include informative sessions or elements of food education that can be decided together with the teachers: climate food quiz, information searches in class, morning assemblies or broadcasts etc.

Muurame tried a climate food week in 2019 during which the climate impact of school meals was half of what it was normally. Pupils were served veggie wiener sausage sauce, spinach soup made with oat drink, chicken and bean groats sauce, freshwater fish casserole and porridge with climate-friendly sides. Information about the climate impact of food was provided in the school cafeteria and during morning assembly.

After the week, the pupils were asked to fill in a feedback and idea questionnaire online. Many pupils found the climate actions taken at school important. Opinions were divided as to the wiener sausage sauce and the fish casserole, but the other foods were generally liked. The chicken and bean sauce overcame the prejudices: the bean groats were not even noticed in the sauce!

## ENGAGE THE PUPILS: TASTE JURIES, IDEA WORKSHOPS AND QUESTIONNAIRES

Actions engaging the pupils increase the acceptance of the changes and provide important feedback on the preferences and the current tastes of the pupils.



TARU PEITOLA

The participants of taste juries taste new foods or ingredients (e.g., comparison of plant-based proteins) and give direct feedback. In the School Meals 2030 experiments, feedback was given by different age groups (10-16-year-olds). Pupils were excited about expressing their opinion, took the assignment seriously and dared to taste even some of the more unfamiliar foods. There were many surprises and lessons learned!

During the idea workshops, the pupils came up with solutions to develop climate-friendly school meals as part of their lessons. This can be combined with searching for information about the climate impact of food. Ideas can be collected in general or on a particular topic, such as increasing the consumption of vegetarian food or reducing waste.

Questionnaires can be used to examine pupils' opinions of dishes on the menu or the support for new dishes among the pupils. Questionnaires can also be used to see whether different solutions gain support, such as how many pupils would like to replace a certain meat dish with pureed vegetable soup and fresh bread.



**The consumption of the vegetarian option during days with non-vegetarian food options was best increased by placing it next to the non-vegetarian food with a clear sign that the vegetarian alternative is available for eating or tasting to anyone. Vegetarian meals should be included in the menu as equally valuable options.**

# SCHOOL MEALS 2030: MENU WITH HALF THE CLIMATE IMPACT

wk	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1	<b>Vegetarian lasagne</b> Roasted cauliflower	<b>Freshwater fish balls / Baltic herring fillets</b> Mashed potatoes Sour cream and chili sauce Cucumber	<b>Macaroni casserole (meat-free, with broad beans)</b> Ketchup Shredded carrots	<b>4-grain porridge</b> Granola, seeds Apple slices	<b>Pureed vegetable soup</b> Rye bread Lentil and pasta salad
2	<b>Broad bean chili Mexican</b> Tortillas or nachos Corn, broccoli Hempseeds	<b>Freshwater fish casserole</b> Lentil and carrot salad Peas	<b>Curry chicken and bean sauce</b> Barley/oat side Blackcurrant jam Tomato wedges	<b>Spinach soup (made with plant-based milk), egg</b> Flat bread Oven-baked beetroots	<b>Broad bean paella with a rice-oat mix</b> American Chinese cabbage and pineapple salad
3	<b>Vegan kebab sauce</b> Spaghetti Shredded carrots	<b>Freshwater fish patties</b> Mashed potatoes Garlic sauce Roasted cauliflower	<b>Broad bean and cabbage casserole</b> Redcurrants or blackcurrant jam	<b>Carrot pancakes</b> Oat and quinoa salad Lingonberry jam	<b>Pea soup (meat-free), mustard</b> Rye bread Mandarin orange
4	<b>Pureed sweet potato and lentil soup</b> Rye bread, hummus Apple	<b>Pike burger</b> Potato wedges Coleslaw	<b>Oven-based sausage / chicken/veggie balls as alternative</b> Mashed potatoes Peas and shredded cabbage	<b>Barley and spelt porridge</b> Berries, granola, seeds Seasonal fruit	<b>Scandinavian hash</b> Oven-baked root vegetables Pickled cucumber
5	<b>Falafel</b> Potato wedges Chili sauce Green salad, tomato	<b>Baked vegetables and vegan kebab</b> Cabbage and pumpkin salad	<b>Fish nuggets</b> Mashed potatoes with spinach Sour cream sauce Peas, beetroot	<b>Pureed vegetable soup</b> Roasted broad beans Carrot pancakes Banana	<b>Chicken pasta</b> Red cabbage and currant salad Hempseeds
6	<b>Beetroot balls</b> Mashed potatoes Carrot and radish salad Peas	<b>Chicken soup</b> Oat bread Lettuce	<b>Tortilla, bean filling</b> Tomato salsa Corn and carrot salad	<b>Fried fish</b> Mashed potatoes Sour cream sauce Tinned beetroot, pickled cucumber and apple	<b>Spinach pancakes</b> Pasta salad Lingonberry jam

Bread and a spread are served daily. The mealtime beverage included in the calculation is 3 × wk oat drink or climate-compensated milk, otherwise regular milk. More details about the changes on the following page.



In this menu, the vegetable side of the day is often described as a salad. However, experiments and studies have shown that children prefer vegetables as separate components, not mixed together; this should be taken into consideration when serving them.



Many of the changes promote health by reducing the amount of saturated fat or red meat and by increasing the intake of fibre and vegetables.

# CLIMATE ACTIONS IN RECIPES: WHAT WAS CHANGED IN THE EXAMPLE MENU?

## CHANGES TO THE RECIPES OF FAMILIAR FOODS

**Foods containing milk/cream:** (spinach soup, casseroles, mashed potatoes etc.) at least half of the milk/cream is replaced with oat milk or plant-based cream. Milk with its carbon footprint compensated is also acceptable. The change does not usually affect the flavour.

**Fish dishes:** Using freshwater fish reduces the emissions of fish dishes by 60–80%. Pupils find the nuggets and patties tasty.

**Oven-baked sausage:** Replaced with a product with less meat or with chicken or vegetarian balls, which supports the aim to use less processed meat. Some find the oven-baked sausage their favourite food, but opinions are divided: a clear presentation of a vegetarian option should reduce the consumption of sausage.

**Vegetables:** In the main dishes of the climate menu, c. 25% of the tomatoes, pineapple, bell peppers and alike vegetables are replaced with domestic and seasonal root vegetables, onion or cabbages. The change can be focused on specific recipes. The share of root vegetables and cabbage in salads is increased by roughly 25%.

## REDUCING MEAT CONSUMPTION

**In the curry and chicken sauce,** 35% of the meat has been replaced with broad bean groats. The bean groats do not stand out in many foods in the same way as whole beans that some children dislike.

**In the Scandinavian hash,** the amount of wiener sausages is reduced by 25%. By making the pieces smaller, the sensation remains similar. Oven-baked root vegetables, served separately, accompany the Scandinavian hash.

Among others, the macaroni casserole, pea soup and tortillas have been made meat-free.

## NEW PLANT-BASED PROTEINS

Finnish producers provide, e.g., vebab (seit-an kebab), veggie wiener sausages, broad bean and pulled oats products, ground peas, falafels and hempseeds. The availability of locally sourced plant proteins such as broad beans, peas and hemp is worth examining.

More observations about the cost effects of using plant-based proteins can be found on the last page.

## SIDE DISHES

**The basic (energy-providing) side dish:** rice is replaced with oat, pearled spelt / barley or pasta; domestically sourced quinoa is also worth trying in salads.

Instead of cheese, **porridge** comes with seeds, granola and fruit/berries, which also make the porridge more filling.

Instead of cheese, **soup** comes with a side of roasted beans, hummus or peas. Legumes can be pureed as sources of protein in pureed soup. Meat pastries are replaced by “vihis” veggie pastries; rice pasties with flat bread / rye bread or, for example, a veggie pocket pie.

# RECIPES

## BROAD BEAN CHILI MEXICAN (100 SERVINGS)

Suitability: GF VG LL LF MF

Purchase weight	Actual weight	Ingredient
0.300 L	0.300 L	Oil rapeseed
0.030 KG	0.030 KG	Cumin
0.030 KG	0.030 KG	Mixed spices chili
0.020 KG	0.020 KG	Paprika smoked
1.000 KG	1.000 KG	Onion diced frozen
1.000 KG	1.000 KG	Diced bell pepper red frozen
0.100 KG	0.100 KG	Crushed garlic canned
1.000 KG	1.000 KG	Tomato sauce/puree 28-30%
2.000 KG	2.000 KG	Crushed tomatoes
2.000 KG	2.000 KG	Seasoning sauce Taco strong
3.000 KG	3.000 KG	Beanit® Fava bean Mince
5.833 KG	3.500 KG	Kidney beans in brine
0.150 KG	0.150 KG	Corn starch
0.300 L	0.300 L	Water for thickening
0.200 KG	0.200 KG	Sugar granulated
0.050 KG	0.050 KG	Salt granulated iodised

### Instructions

- › Heat oil in a pot.
- › Add spices, fry for a moment.
- › Add onions, bell peppers and garlic, fry for a moment.
- › Add tomato puree and fry for a moment.
- › Add crushed tomatoes and taco sauce. Simmer for a moment.
  
- › Drain and rinse the beans.
- › Add the Beanit® Fava bean Mince and beans in the sauce base. Heat.
- › Prepare the water and corn starch thickening.
- › Pour the thickening mixture slowly into the sauce while whisking constantly. Heat and bring to a boil.
- › Add the sugar and salt.
- › Check the yield, structure and flavour.
- › Serve tortillas or nachos as a side.



# BROAD BEAN, VEGETABLE AND CABBAGE CASSEROLE (100 SERVINGS)

Suitability: GF VG LL LF MF HEART-HEALTHY

Purchase weight	Actual weight	Ingredient	
0.200 L	0.200 L	Oil rapeseed	➤ Add water and the stock powder into the pot.
1.750 KG	1.750 KG	Onion diced frozen	➤ Cook for c. 30 min depending on the "maturity" of the cabbage, until the cabbage has slightly softened.
13.500 KG	13.500 KG	Cabbage sliced	➤ Add rice and spices into the pot. Allow the mixture to boil for c. 5 min.
1.250 KG	1.250 KG	Broad bean groats	➤ Turn off the heat and allow to rest for a moment.
11.000 L	11.000 L	Water	➤ Cook in a combination oven at 150°C for c. 50-60 min. (humidity 60%).
0.080 KG	0.080 KG	Vegetable stock powder Promix	➤ Check the flavour and make sure the food is cooked.
1.150 KG	1.150 KG	Rice sticky	
0.005 KG	0.005 KG	Black pepper powder	
0.015 KG	0.015 KG	Marjoram dried	
0.400 KG	0.400 KG	Syrup	
0.120 KG	0.120 KG	Salt granulated iodised	

## Instructions

- Shred the cabbage using a vegetable cutter with a 3-4 mm slicer blade.
- Heat oil in a pot, add the onions and cabbage. Fry/simmer until the cabbage has slightly softened.
- Add the broad bean groats, simmer for a moment.



# PUREED SWEET POTATO AND LENTIL SOUP (100 SERVINGS)

Suitability: DF GF EF VG

<b>Purchase weight</b>	<b>Actual weight</b>	<b>Ingredient</b>	<b>Instructions</b>
4.750 KG	4.750 KG	Sweet potato piece, frozen	<ul style="list-style-type: none"><li>➤ Rinse the potatoes and parsnip with cold water.</li><li>➤ Add potatoes, vegetables and spices into a pot.</li><li>➤ Boil until soft.</li><li>➤ Puree the ingredients into a smooth consistency.</li></ul>
4.000 KG	4.000 KG	Potato serving peeled	
0.250 KG	0.250 KG	Onion diced	
0.080 KG	0.080 KG	Knorr vegetable stock low-salt	
0.033 KG	0.033 KG	Salt with herbs	
7.500 L	7.500 L	Water	
3.500 KG	3.500 KG	Menu coconut milk	
0.050 KG	0.050 KG	Knorr ginger pure	
0.045 KG	0.045 KG	Table salt	
0.500 KG	0.500 KG	Lentil red	
1.000 KG	1.000 KG	Parsnip peeled	

# MACARONI CASSEROLE WITH BROAD BEANS (100 SERVINGS)

Suitability: LF, milk-free when using plant-based cream

<b>Purchase weight</b>	<b>Actual weight</b>	<b>Ingredient</b>	<b>Instructions</b>
6.000 KG	6.000 KG	Macaroni, dark (wholewheat)	<ul style="list-style-type: none"><li>➤ Boil the broad bean groats at a pressure of 0.5 b for 10 min or steam for 0.5 hours.</li><li>➤ Add onions and spices into the cooked groats.</li><li>➤ Boil the macaroni for 7 min.</li><li>➤ Place the macaroni, beans and diced bell peppers at the bottom of the pan.</li><li>➤ Add the cream and egg mixture.</li><li>➤ Bake in a combination oven at 160°C for c. 1 hour.</li></ul>
0.500 KG	0.500 KG	Onion diced	
2.280 KG	2.280 KG	Broad bean groats dry	
8.000 KG	8.000 KG	Diced bell pepper red fresh	
0.010 KG	0.010 KG	Vegetable stock powder	
0.030 KG	0.030 KG	Garlic powder	
0.030 KG	0.030 KG	Provence spice mix	
0.030 KG	0.030 KG	Paprika	
0.020 KG	0.020 KG	Table salt	
4.500 KG	4.000 KG	Egg	
6.000 KG	6.000 KG	Cooking cream Menu 15 %	
0.300 KG	0.300 KG	Table salt	
0.040 KG	0.040 KG	Salt with herbs	
0.004 KG	0.004 KG	Garlic powdered	
		Water	

# CLIMATE ACTION HAS MANY BENEFITS

**Actions that promote climate-smart school meals often have other benefits as well:**

- › **Health:** reduced consumption of red and processed meat.
- › **Health:** reduced intake of saturated fat and increased intake of vegetable fats.
- › **Nutrition:** increased consumption of fruits and vegetables.
- › **Nutrition:** increased intake of fibre.
- › **Economic and social sustainability:** climate action can also be promoted by supporting regional food production and entrepreneurship, for example by creating new value chains.

## MUNICIPAL SUPPORT FOR THE SUSTAINABILITY EFFORTS OF CATERING SERVICES

The support of the municipality for the development and climate action of school meals is vital. The support is part of the municipalities' sustainability and climate action, which is important and topical, as well as the promotion of responsibility in public procurement.

Primary methods of support:

- › defining a clear climate goal - such as reducing emissions by 35% by 2030 - and other sustainability goals for the catering services in the municipal strategies/budget
- › climate action and other sustainability efforts included in the instructions for sustainable public procurement
- › allocation of financial resources in the further training of personnel
- › increasing the financial resources for catering services committed to the climate



goals, as part of the promotion of more sustainable public procurement.

## WHAT ABOUT THE COSTS?

The cost effects of climate action in catering are moderate. To begin with the 'low-hanging fruits', you can go far even without any growth in the overall procurement expenses of ingredients.

- › Vegetable proteins that resemble meat, such as the plant-based mince products, have a similar price per kilogram as the most expensive animal proteins used in meals for large masses. For example, replacing beef with such products does not increase the costs significantly.
- › Partly replacing meat with bean groats or vegetables in meat dishes generates savings.
- › Pulses as such or in the form of groats are inexpensive, and using them in dishes almost always generates substantial savings. By utilizing a balanced variety of plant-based proteins to make a change, you can even keep the overall costs the same.
- › In terms of vegetables, climate actions generate savings: root vegetables, cabbages and onions are often inexpensive and most climate-friendly options.



**Only a small proportion of Finns eat as much fruits and vegetables as they should according to the nutritional recommendations. School meals have taught Finns to eat salad. Now, they can teach a new generation to eat enough fruits and vegetables!**

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