



# SUSTAINABLE HEALTH FROM FOOD

– National Nutrition Recommendations 2024

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# Preface

The aim of the nutrition recommendations is to promote public health. The recommendations are widely used in healthcare, food service meal planning, food product development, communications and as core material for nutrition education. They also play an important role in assessing the food consumption and nutrient intakes of different population groups. Nutrition recommendations are only effective if they are adopted and applied in practice extensively.

Finnish food habits have improved in recent decades, but the challenges that remain are excessive salt and saturated fat intakes and insufficient fibre intake. More plant-based diets, i.e. an increase in the proportion of whole grains, vegetables, berries, fruits and legumes in the diet, would promote both human health and environmental well-being. In addition, diets should prefer sources of unsaturated fat such as vegetable oils, fish and nuts, and limit the use of salt. The food environment has a significant impact on food choices. The supply of easily consumed and energy-rich foods has increased while meal and package sizes have also grown. A central objective of the nutrition recommendations is to increase the supply and availability of health-promoting foods to all population groups.

Nordic cooperation has a long tradition in the development of nutrition recommendations. The new national nutrition recommendations are based on the Nordic Nutrition Recommendations published in summer 2023, which were created by systematically reviewing the latest research evidence. All quantitative recommendations are based on consistent research evidence on the relationship between nutrition and health. Another central objective of both the Nordic and national nutrition recommendations is to promote planetary health, i.e. the mutually supportive well-being and health of people and the rest of nature.

More comprehensively than before, the recommendations pay attention to not only the health impacts of food but also the environmental impacts of food production and consumption. The preparation of the national food-based dietary guidelines considered up-to-date information about Finnish food consumption and nutrient intake in both adults and under school-age children. Based on this data, modelling calculations were performed, which were used to determine the adequacy of nutrient intake in different population groups and the difference in environmental impacts when switching to plant-based diets in accordance with the dietary guidelines. In particular, Finnish research evidence was used in the environmental impact assessment. Some themes related to the sustainability of food production, including animal welfare and the ethics of food production, were excluded from the recommendations.

High-quality monitoring of food consumption has a long tradition in Finland. In the recommendations, the data on food consumption and nutrient intakes of Finnish adults are mainly based on the 2017 FinDiet Survey. It is important to continue the collection of data on the Finnish population's food consumption and expand it to cover all age groups. Food consumption data are needed to monitor and evaluate the impacts of nutrition recommendations. Without reliable monitoring data about food consumption, we cannot assess how well nutrition recommendations are implemented in practice and how they impact public health.

The national recommendations are supplemented by food-based dietary guidelines for families with children and older people, guidelines for nutritional care, recommendations guiding school and student meals, recommendations for food fortification, and recommendations for the use of dietary supplements. They will be updated to reflect the new national recommendations.

A new food pyramid and several examples of recommended meals have been created to support food choices. A new section at the end provides a comprehensive description of the implementation. The key message of the recommendations is the variety, variability, moderation and enjoyability of the diet – while not forgetting the joy of food.

In September 2023, the National Nutrition Council (VRN) appointed an expert group to prepare the national nutrition recommendations based on the new Nordic recommendations. The preparation of the recommendations was coordinated by the chair, vice-chair and secretary, who reported on the progress of the work to VRN. The recommendations were worked on in thematic groups (Appendix 15), which had several expert consultations (Appendix 16). The modelling working group carried out the modelling calculations for the recommendations (Appendix 13). In addition, two public stakeholder meetings and an extensive public consultation round on the draft recommendation were organized. We warmly thank everyone who participated in the recommendation work.

The national nutrition recommendations are a joint publication by the National Nutrition Council and the Finnish Institute for Health and Welfare (THL). This recommendation replaces the 'Health from Food – Finnish Nutrition Recommendations, 2014' and the 2008 'Beverages in Nutrition' recommendation.

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# Glossary

## **Added sugar**

Sugar added to food and food products at home or in the food industry or used as such. Contains sucrose, fructose, glucose, and starch sweeteners (e.g. glucose syrup, glucose-fructose syrups). Added sugar is included in free sugar. The sugars naturally present in vegetables, berries, and fruits eaten as such and used in cooking are not considered added sugar.

## **Climate impact**

The climate load caused by a products, services, operations, operator or an economic sector, for example. Climate impact assessment is based on the amount of greenhouse gases released from operations. The climate impact is also often referred to as the carbon footprint.

## **Eating behaviour**

The motives, choices, actions and practices related to food and eating.

## **Emotional eating**

The use of food to regulate mood and emotions, not for the body's nutritional needs.

## **Energy density**

The energy content of a food product, food or diet per weight unit. Energy density (kJ/g or kcal/g) depends on the composition of the food product, food, or diet. Water and fibre reduce energy density. Energy density is usually high when the food product, food or diet is high in fat and/or free sugar and low in dietary fibre.

## **E% = energy percentage**

The percentage of energy derived in the body from energy-yielding nutrients and other energy-yielding dietary substances as a proportion of total energy intake.

## **Eutrophication**

An increase in primary production due to excessive nutrient loads (nitrogen and phosphorus).

## **Food-based dietary guidelines**

Research-based recommendations for health-promoting food choices.

## **Food education**

Guidance and educational activities that aim to develop the capacity of individuals and communities to make health-promoting, sustainable and culturally diverse food choices.

## **Food environment**

Physical, economic, political, and sociocultural environments, opportunities, and conditions that influence people's food choices and nutritional status.

## **Food competence**

Knowledge and skills about the origin, routes and quality of food, cooking methods, and food and eating culture. Eating situations are one of the learning environments in which food competence can be developed. People apply their nutrition knowledge and food cultural background to their food choices and eating situations while acquiring knowledge, skills and valuations for their everyday life.

## **Food relationship**

Thoughts, beliefs, and emotions related to food and eating, including the connection between body image and eating, values, norms, goals and habits.

## **Food sense**

A situational understanding of food-related phenomena, the ability to solve problems that arise in everyday situations and, if necessary, to change routines and practices to, for example, better promote health and sustainability. Food sense can extend from personal preferences to understanding and practices at the food system level. When built through collaboration between people, it is shared food sense.

## **Food security**

Physical, social and economic access to sufficient, safe, nutritious and culturally appropriate food. Food security encompasses food availability, food accessibility, i.e. people's purchasing power, food utilization, nutritional quality, and the continuity of these factors.

## **Food system**

A system consisting of the production, processing, distribution and consumption of food and the links between the various factors involved. It is also influenced by the prevailing economic thinking and the values, attitudes and practices it upholds.

## **Free sugar**

Sugar added to food and food products at home or in the food industry or used as such, as well as sugar present in honey, syrups, vegetable drinks (such as oat drinks), and fruit and berry juices and concentrates thereof. The sugars naturally present in vegetables, berries and fruits eaten as such and used in cooking are not considered free sugar.

## **Global biodiversity loss**

The extinction of species at an accelerating rate. Global biodiversity loss is used as one indicator of biodiversity. It refers to the extinction of species native to a given region, whereby they also disappear from the world.

## **Greenhouse gas**

The atmospheric gases that maintain and intensify the greenhouse effect, such as carbon dioxide, methane, ozone, nitrous oxide, and freons.

## **Joy of food**

A sense of well-being that comes from cooking, eating and commensality. It emphasises joy, a sense of community and experiencing food with all senses.

## **Local food**

Food produced and processed using ingredients derived from the local region and marketed and consumed in the region, promoting the local economy, employment and food culture of the region.

## **Metabolic food waste**

The amount of food exceeding the nutritional need and the impact of this overconsumption on the environment. Metabolic food waste is expressed in terms of overconsumption of food (kg) and the environmental impacts it causes, including carbon, water and land-use footprints.

## **Nutrient density**

The amount of nutrients in a food product or diet per energy unit, which can be expressed as mg/MJ or mg/1,000 kcal, for example.

## **Nutrition recommendations**

Research-based, population-level guidelines that includes nutrient intake recommendations (dietary reference values) and recommendations for health-promoting food choices (food-based dietary guidelines).

## **Nutritional security**

Nutritionally adequate, suitable and safe nutrition for each population group. Nutritional security is one dimension of food security. Nutritional security is realised when a person gets the nutrients they need at different stages of life in sufficient and safe quantities.

## **Poultry meat**

Poultry refers to birds that are reared for consumption and mainly means chicken, turkey and duck meat.

## **Primary production**

Activities that produce food ingredients for direct consumption or further processing. Primary food production includes rearing, cultivation, harvesting and all stages of animal production before slaughter.

## **Processed meat**

A meat product made by smoking, salting or adding nitrite to improve flavor or shelf life. Processed meat includes products such as sausages, frankfurters, hams, cold cuts, salamis and bacon. The ingredient used can be red meat or poultry meat.

## **Red meat**

The meat and organs of cattle, pig, sheep, horse, goat, deer, reindeer and elk. The recommendation for the consumption of red meat applies to beef, pork and lamb, as most research evidence is available for their health and environmental effects.

## **Saturated fat**

Fat rich in saturated fatty acids. Saturated fat is solid at room temperature. It is present especially in high-fat dairy products such as cheese, cream and butter, as well as meats and meat products. Tropical vegetable fats such as coconut fat, coconut oil, shea oil and palm oil also contain a lot of saturated fat. Saturated fat and trans-fat are also referred to as solid fat.

## **Security of supply**

Activities that aim to secure the production, services and infrastructure necessary for the livelihood of the population, the country's economy and national defense in the event of serious disruptions and exceptional circumstances. The goal is society's ability to cope with disruptions and crisis conditions with minimal special arrangements and adverse consequences.

## **Tropical oils**

Vegetable oils from tropical plants, including coconut, shea, palm and palm kernel oils. Tropical oils are rich in saturated fat.

## **Unsaturated fat**

Fat rich in unsaturated fatty acids. Unsaturated fat is liquid at room temperature. It is found especially in fish and other seafood, non-tropical vegetable oils, vegetable oil-based margarines and fat spreads, and nuts and seeds. Unsaturated fat is also called liquid fat.

## **Vegetable fat spread**

Spreadable fat containing only plant-based fats. Animal-based fat such as milk fat may account for up to 2% of the fat content. The fat content of vegetable fat spread is 30 to 70%.

## **Whole grain**

Intact, flattened, broken or ground grains from which inedible parts have been peeled off. Whole grains include all the edible parts of the grain, including the bran and germ. This also preserves fibre, vitamins and minerals. The proportions of the main structural components of the grain, i.e. the endosperm, germ and bran, are the same as in an intact grain.

## **Whole grains product**

Food products in which whole grains are the main ingredient, and in which they account for at least 50% of the dry weight of the product. Many whole grain products also contain more highly processed low-fibre cereals such as more highly processed wheat flour due to taste and better baking properties. Whole grain bread refers to bread in which at least 50% of the cereals used are whole grain. Other whole grain products include whole grain pasta, barley and rice. If the cereal product contains at least 25% whole grain, the packaging of the product may bear the labelling 'contains whole grain'.

A wider glossary of nutrition science is openly available in the [Helsinki Term Bank for the Arts and Sciences](#).

Research evidence as  
the basis for nutrition  
recommendations.



## BASIS AND INTENDED USE

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## Nutrition recommendations – a scientific basis for health promotion

- ▶ **The main objective of these nutrition recommendations is to promote the health of the population through nutrition.**
- ▶ **The nutrition recommendations are based on high-quality scientific research and consistent research evidence.**
- ▶ **Nutrition recommendations include nutrient intake recommendations and food-based dietary guidelines.**
- ▶ **The population’s average requirement for energy and nutrients has been determined and, based on this, the recommended intake has been defined, which maintains a good nutritional status of the population.**
- ▶ **Food-based dietary guidelines emphasise health effects, but they also take environmental impacts into account.**

The nutrition recommendations are used especially in nutrition monitoring and evaluation, the decision making, guidance and planning of nutrition-related national and regional measures, and communication (Figure 1). The monitoring and evaluation compare the food consumption and nutrient intakes of different population groups with the recommendations. If it is found that the intake of a particular nutrient is too low or too high, this information can be used to plan measures such as the fortification of food products. The recommendations are used in the planning of meal services to prepare menus and design meals for early childhood education, schools, workplaces, hospitals, nursing homes, home meal services and the Defence Forces. Such planning is based on both food-based dietary guidelines and dietary reference values. The recommendations can also be used in product development in the food industry.

NUTRITION RECOMMENDATIONS 2024  
**SUSTAINABLE DIETS**



**ECOLOGICALLY SUSTAINABLE**

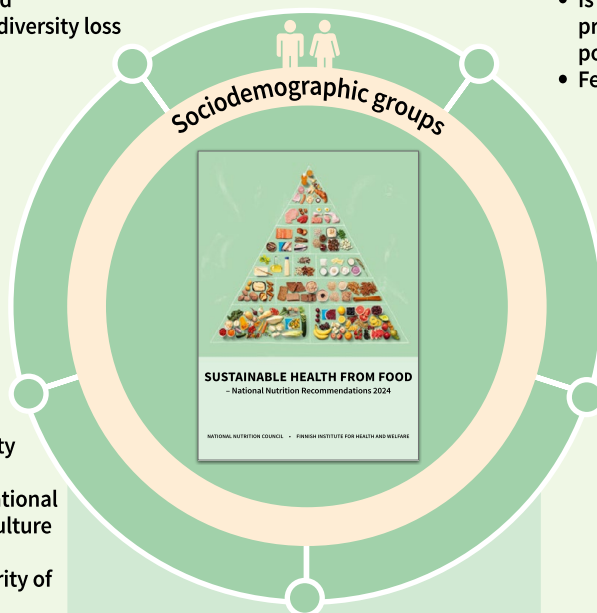
- Reduces the climate load
- Helps reduce global biodiversity loss
- Reduces eutrophication

**PROMOTES HEALTH**

- Is nutritionally adequate and promotes the health of all population groups
- Feasible and acceptable

**SOCIALLY SUSTAINABLE**

- Promotes health equality
- Takes the special characteristics of the national food system and food culture into account
- Improves the food security of households



**ECONOMICALLY SUSTAINABLE**

- Affordable
- Accessible for all population groups
- Supports the work ability of the population and the functioning of society
- Reduces healthcare costs
- Promotes the efficient use of inputs and economic resources

**IMPLEMENTATION, MONITORING AND EVALUATION**

- Research-based approaches and tools
- Active communication and interaction with stakeholders
- Monitoring across all population groups

**Figure 1.** The health and sustainability goals of the nutrition recommendations are achieved through implementation that reaches all population groups.

Nutrition recommendations lay the foundation for nutritional guidance, food education and nutrition communication, which aim to influence the population's food habits and nutrient intakes. In addition to visual and verbal communication, the guidance measures also include physical changes in food environments such as the food selection and display in mass catering and shops.

The dietary reference values have been drawn up for the population, taking the variation in nutrient needs between individuals into account. The recommendations have a long time span: recommended intake of each nutrient should be met within weeks or months. The body adapts to fluctuations in intake by storing nutrients when there is excess in intake and using them when necessary. The body's storage capacity varies from nutrient to nutrient; stocks of water-soluble vitamins are usually sufficient for up to a few weeks, whereas stocks of fat-soluble vitamins may be sufficient for months or years.

The nutrition recommendations apply to all age groups: infants, children, adolescents, adults, older people, and pregnant and lactating women. Targeted recommendations have also been issued to different population groups and the professionals guiding them, including healthcare and social service, food service and education professionals, taking the specific nutritional needs of specific groups into account. The recommendations also take into account temporarily increased nutritional need when a person has a mild infection, for example. However, as a rule, they cannot be applied as such to long-term inflammatory diseases, and metabolic disorders but serve as a basis for the nutritional treatment of these diseases. The recommendations are also applicable to persons who have been diagnosed with a non-communicable disease (e.g. type 2 diabetes, cardiovascular disease or cancer), or who have risk factors for the development of non-communicable diseases (e.g. dyslipidemia, hypertension or elevated blood glucose), unless the disease or medication significantly affects the nutritional status or the need for nutrients (see [Guidelines for nutritional care](#)). The recommendations can also be applied to people who have overweight or obesity.

The 2024 Finnish Nutrition Recommendations are based on the [Nordic Nutrition Recommendations](#), which were created as a result of thorough scientific research by an extensive Nordic expert group. Their aim is to promote health, respond to the nutritional and health problems of the Nordic and Baltic countries, and to reduce the adverse environmental impacts of food consumption. For the Nordic Nutrition Recommendations, experts prepared reviews that included the latest research evidence on the relationship between nutrients, food groups and diets and health. In addition, the Nordic recommendations draw on international high-quality systematic reviews based on hundreds of original studies. The environmental impacts of food were assessed in four review articles co-authored by Nordic and international experts. The method descriptions and scientific reviews of the nutrition recommendations have been published as part of the Nordic recommendations and in the scientific journal [Food & Nutrition Research](#). The scientific basis of the recommendations will not be separately described in these national recommendations.

## Features of finnish food consumption and nutrition

- ▶ Diets and nutrition vary by individual and population group.
- ▶ Finnish food consumption and nutrient intake have both positive and unfavourable developments.
- ▶ Food services play an important role in supporting good nutrition.

Individual food choices are guided by values and attitudes, as well as by price, taste preferences, familiarity, health and environmental aspects, production method, ease of cooking and concerns about food safety and origin. Regional and ethnic food cultures contribute to the diversity of food consumption, as do religious food rules and special diets related to diseases.

In addition to individual factors, choices are influenced by the social and physical food environment. The importance of the social food environment such as family and friends is conveyed through social norms, among other things. The physical food environment is built on elements such as the supply of shops and food services, i.e. on the accessibility and availability of food. The macro environment, which consists of societal structures and actors, shapes the food environment through marketing, legislation, taxation and other steering methods. Taxation can be used to raise the prices of products that are harmful to health and the environment, and to lower the price of vegetables, berries and fruits. The food environment can affect food choices in different ways. For example, a large selection of food products enables a varied diet but may also lead to choices that are unfavourable for health and the environment.

## Food services are an integral part of the Finnish food culture

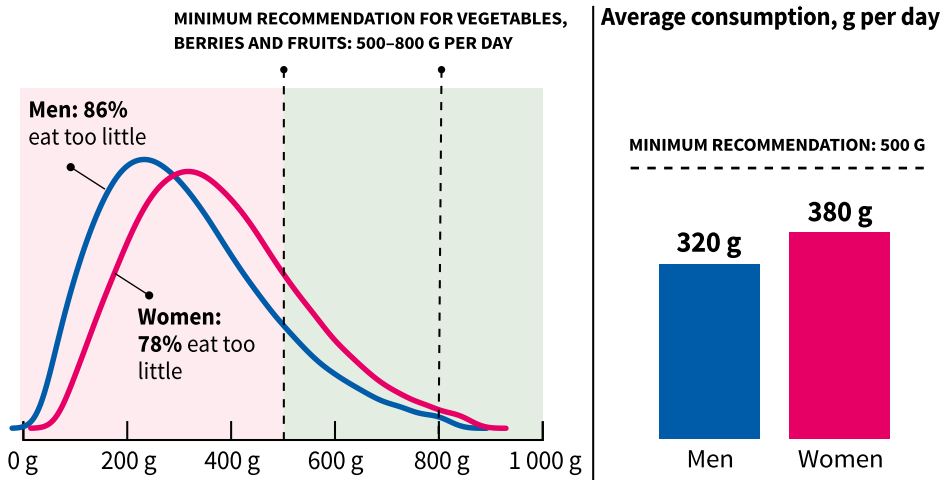
At least one in two Finnish working-age people eats lunch at their workplace or educational institution, and almost all children of early childhood education or school age have lunch at day care or school. Public food services and workplace restaurants play an important role in guiding and supporting good nutrition. Finnish school meals are an internationally acclaimed social innovation. They guarantee a free hot meal for every child and young person, regardless of their family background. However, only one in three pupils eats all the meal components at school lunch.

The lunch habits of people who eat in workplace restaurants are closer to the nutrition recommendations than those of people who eat elsewhere: they more often choose fish and vegetables and eat more berry and fruit dishes. However, the availability of food services varies. Highly educated people are twice as likely to have the opportunity to have lunch at their workplace or educational institution as less educated people. Workplace food services are only used by about half of those who have the opportunity to do so. Those working in small workplaces, with little education, living in small towns or doing mobile work, as well as unemployed people and other adults not working have the least opportunities to participate in food services. In Finland, it is common that people bring their own food for lunch or eat lunch at home on weekdays.

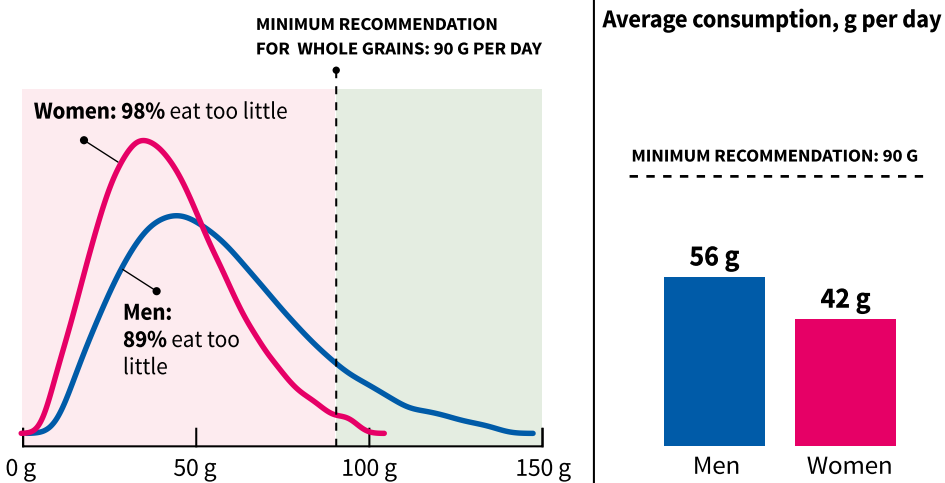
Finnish adults eat or drink an average of seven times a day. Breakfast, lunch, dinner and evening snack are part of almost everyone's meal rhythm. The main meals – breakfast, lunch and dinner – provide around 60% of the energy during the day. People who work remotely eat fewer meals that follow the plate model, have lunch alone more often and have a more irregular meal rhythm.

## Food consumption and nutrient intake: positive and unfavourable developments

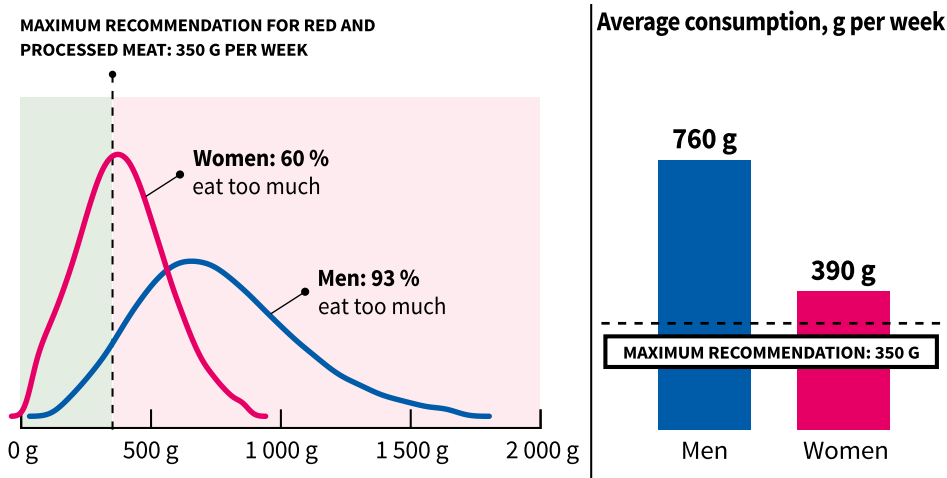
Finns' food habits have developed in a positive direction over the past decades, but unfavourable developments can also be seen. Today, Finns eat four times more vegetables, berries and fruits than in the early 1950s. Despite the positive development, on average, the adult population does not achieve the nutrition recommendations, especially when it comes to the consumption of vegetables, berries and fruits (Figure 2), as well as fish. The consumption of cereals, especially rye, has decreased (Figure 3). Nowadays, Finnish people eat more than twice as much meat as in the 1950s. In recent decades, the consumption of poultry meat in particular has increased. Men's consumption of red and processed meat is significantly higher than recommended (Figure 4).



**Figure 2.** Finnish women and men eat less vegetables, berries and fruits than recommended. Source: The national FinDiet Survey



**Figure 3.** 11% of men reach the minimum recommendation for whole grains (90 g per day in dry weight), 2% of women. Source: The national FinDiet Survey



**Figure 4.** Finnish women and men eat more red and processed meat than recommended. Men eat red and processed meat more than twice as much as recommended. Source: The national FinDiet Survey

The proportion of carbohydrates in the total energy intake has decreased, whereas the proportions of fat and protein have increased. While the quality of fat in the diet has improved, saturated fat intake is still higher than recommended with almost everyone (Appendix 1). Fibre intake has increased over the last 20 years, but there is still a long way to go to reach the recommendation. At least one in five Finns has an intake of vitamin E, calcium, selenium and zinc below the average requirement. With two in three Finns, the intake of folate is insufficient. A quarter of women and half of men have vitamin C intake below the average requirement (Appendix 2).

In adults, the intake of vitamin D from food has improved thanks to the fortification of liquid dairy products and fat spreads with vitamin D, and the use of dietary supplements. Salt intake has decreased due to collaboration between different stakeholders and legislators, but no further reductions have been observed since 2007. Almost all Finns get more salt than recommended (Appendix 3). The intake of iodine has improved as the food industry, food services and households have switched to using iodised salt in cooking following the recommendation of the National Nutrition Council.

At least half of men and two thirds of women use dietary supplements. Their use is more common among older people and more highly educated people. The use of dietary supplements is often unnecessary, but when used in accordance with the recommendations, they have a significant impact on the adequate intake of vitamin D in children and adolescents, and of vitamin B<sub>12</sub> and iodine in those who follow a vegan diet. The adequate intake of nutrients can also be ensured through the fortification of food products (see the chapter ‘Fortification of food products and dietary supplements’).

## Sociodemographic and regional differences in food consumption and nutrient intake

Population group related differences in food consumption are linked to risk factors and morbidity of non-communicable diseases that burden public health. Food consumption varies by population group throughout the life course. The diet of the most highly educated, high-income and urban women is closest to the nutrition recommendations. Correspondingly, the diet of individuals with low education, low-income and men differs the most from the recommendations, and the environmental burden of their food choices is greater than that of other groups. Dietary differences are particularly visible in the lower consumption of vegetables, berries and fruits, and higher consumption of red and processed meat.

The youngest age groups (18 to 44 years) eat more chicken and turkey dishes, yoghurt, quark, legumes, nuts, vegetable oils and sweets. Older age groups (65 to 74 years) consume more berries, fruits, potatoes, fish and cereal products (porridge, rye bread) than younger ones. So far, no comprehensive national monitoring data are available on the food consumption of children, adolescents and people over 75 years of age. In 2024, the first national comprehensive survey into young people's nutrition was launched.

There are also regional differences in food consumption. Recommended food choices are best realised in the Helsinki region and in major cities. The regional differences are explained by several factors. The higher level of education of the urban population is associated with healthier food choices such as the increased consumption of vegetables, berries and fruits. In Eastern Finland, on the other hand, people are used to eating rye bread. The consumption of berries and fish is also common. The differences may also be explained by other regional traditions in food consumption.



## Health effects of foods

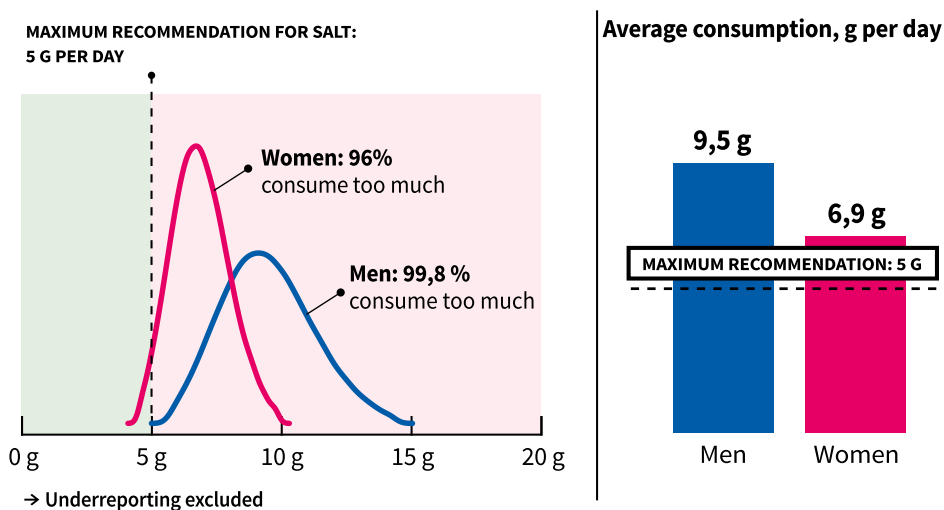
- ▶ For Finns, the most significant health-related nutritional challenges are high intake of salt and saturated fat, and low intake of fibre.
- ▶ Weight gain is the result of energy intake exceeding energy expenditure in the long term.

The national nutrition recommendations provide a model for evidence-based, health-promoting diets which are rich and varied in wholegrain products, vegetables, berries, fruits, legumes and fish, and moderate in fat-free or low-fat dairy products. These diets also favour sources of soft fat and restrict the use of salt. A recommended diet can reduce the risk of obesity, high blood pressure, non-communicable diseases such as cardiovascular diseases, type 2 diabetes and cancers, and depression.

Nutritional risk factors cause a considerable burden of disease in the Nordic and Baltic countries, especially by increasing the risk of type 2 diabetes, coronary heart disease, stroke and colorectal cancers. In Finland and the Nordic countries, the low consumption of whole grains is the most significant dietary factor explaining the disability-adjusted life years (DALY). It is also the main nutritional factor explaining the burden of coronary heart disease and colorectal cancers. The high consumption of red meat and processed meat and the low consumption of vegetables, berries and fruits also significantly increase the burden of disease in Finland.

Finns' intake of dietary fiber is lower than recommended, which is mainly due to the low consumption of whole grain products. Adequate fibre intake is associated with a lower risk of colorectal cancers, coronary heart disease, stroke, type 2 diabetes and premature death.

Nearly all Finns exceed the recommendation for salt intake (Figure 5). Exceeding the recommended salt intake increases the risk of hypertension and stroke and is associated with premature mortality. Reducing the daily salt intake by only one gram significantly reduces the health hazards of salt, including cerebral haemorrhages, at the population level. In addition to salt, intake of saturated fat is too high in almost all Finns compared to the recommendations. Among other harms, excessive saturated fat in the diet increases the risk of cardiovascular diseases and weakens the body's glucose metabolism.



**Figure 5.** Almost all Finns exceed recommended dietary salt intake levels.

Source: The national FinDiet Survey

Beverages, sweets, chocolate and other high-sugar food products and acidic drinks cause tooth decay. They damage tooth enamel and increase unfavourable bacterial growth, exposing teeth to cavities. In addition, acidic drinks cause tooth erosion, that is, the dissolution of tooth enamel. Water is the recommended beverage of choice for both adults and children. Berries and fruits are best eaten as such.

Taste preferences and food habits develop early and often persist into adulthood. Early nutrition has a significant impact on health and disease risk throughout life. Especially during gestation and early childhood, the organs grow and develop rapidly, which makes these periods sensitive to the effects of nutrition. The nutrients available for development and growth permanently affect the structures, functioning and metabolism of the body, including the oral and intestinal microbiota and the immune system. The early nutritional status programmes the body's metabolism until adulthood.

Food habits that promote health are the basis of well-being throughout life. In adulthood, the importance of healthy eating habits is emphasised as the risk of non-communicable diseases increases with age. The risk of memory disorders that become more common with age is increased by abdominal obesity, high blood pressure, high cholesterol and elevated blood glucose levels in middle age. Unintentional weight loss and malnutrition become more due to aging and (in relation to) illness. As appetite decreases, it is important to ensure common adequate food intake and maintain a good nutritional status. An adequate intake of energy and protein and a recommended diet prevent malnutrition, maintain functional capacity and cognition, prevent the emergence and recurrence of diseases, and help with recovery and rehabilitation.

## Balance of energy intake and expenditure

- ▶ **In terms of health, the recommended body mass index (BMI) is 18.5 to 24.9 kg/m<sup>2</sup>.** The BMI is calculated as follows: weight (kg) / (length (m) \* length (m)); for example: 68 kg / (1.7 m \* 1.7 m) = 23.5 kg/m<sup>2</sup>.
- ▶ **In addition to the BMI, it is important to measure the waist circumference.** In terms of health, the recommended waist circumference is less than 90 centimetres in women, and less than 100 centimetres in men.

The regulation of eating and energy balance is influenced by genetic, biological and psychological factors, and the living environment. Overweight and obesity are common and are caused by prolonged excessive energy intake in relation to energy expenditure. Excess fat accumulated in the body can cause low-grade inflammation and disrupt cell function. For health, the accumulation of fat in the abdominal cavity and internal organs (so-called abdominal obesity) is particularly harmful.

Obesity is a risk factor to many long-term diseases, including type 2 diabetes, cardiovascular diseases, musculoskeletal diseases and multiple cancers. It is also linked to psychosocial well-being, mental health and quality of life. In addition, obesity is associated with a negative stigma and discrimination generated by our society's cultural norms, which increases mental health challenges and makes weight management more difficult. The environment and health behaviour, including diet, physical activity and sleep, are linked to the prevalence of obesity. While genes can increase the risk of obesity, health-promoting behaviours have the potential to support weight management and promote health at all ages. Adherence to health-promoting diet and other health behaviours brings health and well-being regardless of weight. A moderate amount of food promotes weight management and health. The plate model helps to visualize the portion sizes and the proportions of different foods in a meal.

## Health-promoting food choices are the foundation of weight management

A health-promoting diet can be implemented in many ways. It is important to consider individual preferences and opportunities for adhering to a diet in a longer term. A diet that favours whole grains, berries, fruits, vegetables, legumes, nuts and fish is associated with a lower risk of weight gain, whereas a high consumption of low-fibre cereals, red and processed meat, and sugary beverages is associated with a higher risk. Alcoholic beverages also contain a lot of energy. The consumption of solid food reduces appetite and the amount of food eaten more than liquid foods. The nutrition recommendations contain guidelines for the daily consumption of foods, and they also provide a framework for health-promoting menu planning in food services.

A regular meal pattern is an essential part of weight management as it keeps individual meal sizes moderate and reduces snacking. In addition, constant snacking maintains an acid attack in the mouth and increases the risk of oral diseases. A regular meal pattern supports the natural regulation of eating, maintains alertness and promotes oral health.

A lower energy density of the diet supports weight management. For example, adding vegetables, berries, and fruits to the diet reduces energy intake because they contain a lot of water and soluble fibre that promotes satiety. Water is the recommended beverage of choice.

Changes in the food environment, such as easy access to food, wide selections, large portion and package sizes, and quantity discounts, can tempt people to eat more. A preference for fatty foods can increase weight gain. Emotional eating, strict diets, stress and sleep deprivation may also lead people to seek pleasure from less-recommended foods. Taste preferences can be changed by exposing oneself to different foods and tastes. Taste preferences that promote health and support weight management can be developed by consciously choosing vegetables, berries, fruits and other recommended, low-energy foods. A positive attitude to eating, acceptance of different foods and a regular meal pattern will help with weight management.

## Exercise and sleep support weight management

Regular exercise supports the natural regulation of eating and helps manage stress. While the effect of exercise on weight loss can vary, it promotes good body composition, improves blood glucose and lipid levels, and reduces low-grade inflammation and blood pressure. Exercise helps maintain the weight gained through weight loss and the health of people of all ages, regardless of body size.

Excessive screen time and sedentary time can lead to weight gain. Spending time on screen exposes people to the marketing of foods and beverages that do not align with the recommendations, increases eating in front of a screen and reduces exercise and sleep.

Sufficiently long and high-quality sleep and a regular sleep pattern are key factors in weight management. People's internal clock is linked to food habits and weight gain. A short night's sleep can affect the hormones that regulate satiety, exposing people to high-sugar and high-fat food choices. A regular meal pattern promotes good sleep, whereas heavy eating in the evening can disturb it. Shift work poses challenges for meal timing, eating regulation and weight management. Regular and health-promoting meals and snacks can support the health of shift workers by reducing stomach upset, fatigue, weight gain and the risk of cardiovascular diseases.



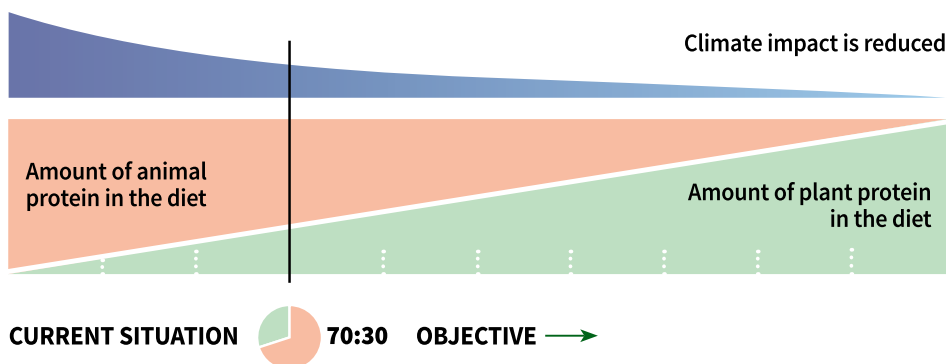
## Environmental impact of food

- ▶ **Finnish food consumption causes environmental impacts both in Finland and abroad.**
- ▶ **Environmental impacts arise mainly in primary production.**
- ▶ **Changes in both diet and agricultural and food production are required to significantly reduce the environmental impact of food. Food choices are an important part of these efforts.**
- ▶ **The environmental impact of diets can be reduced by switching to a plant-based diet.**

Food is a necessary everyday commodity whose purpose is to ensure good nutrition and promote health. However, food production consumes a lot of natural resources and has a significant impact on the environment, including the climate, water system and biodiversity.

The assessment of the environmental impact of diets and food includes all stages of the food production and consumption value chains and their location. Through food imports, the Finnish diet is linked to the global food system, which also causes environmental impacts in importing countries. As most of the environmental impacts of food come from primary production, mainly agriculture and fisheries, the environmental impacts of primary production must also be considered as a separate entity (Appendix 4). On the other hand, food production, packaging materials and transportation usually cause a smaller share of the effects. Significant reductions in the environmental impact of food require changes in both diet and agricultural and food production, and these changes need to be coordinated.

At the beginning of the 2020s, food consumption has corresponded to about 20% of the annual climate impacts of the Finnish consumer. The majority of the climate impacts of the average diet have been caused by the consumption of products of animal origin (65%), especially beef and dairy products. Diets that meet the nutrition recommendations can achieve over a one-third reduction in climate impact. This requires more plant-based diets, the importance of which is illustrated in Figure 6. The environmental impacts of foods are described in Figure 7.



**ANIMAL PROTEIN BASED DIET**

**ADVANTAGES:**

- High-quality protein and a sufficient amount of amino acids
- Readily absorbable heme iron
- Good sources of iodine, vitamin B<sub>12</sub> and calcium
- Vitamin D in a more readily absorbable form

**RISKS:**

- Unfavourable fat quality (high in saturated fat)
- Low fibre intake
- Excessive energy intake

→ Increases the risk of disease (e.g. diabetes, cardiovascular diseases and colorectal cancers)

**PLANT PROTEIN BASED DIET**

**ADVANTAGES:**

- Good fat quality (unsaturated fatty acids)
- High in fibre, folate, phenolic compounds and antioxidants

→ Reduces the risk of disease (e.g. diabetes, cardiovascular diseases and colorectal cancers)

**RISKS:**

- Intake of essential amino acids must be ensured
- Adequate intake of vitamin B<sub>12</sub> and D, iodine and calcium must be ensured
- Stomach discomfort caused by legumes may occur

**Figure 6.** Replacing animal protein with plant protein reduces the climate impact of the diet and affects the health benefits and risks of the diet. The image is adapted from a publication by the ScenoProt project.

Along with climate change, biodiversity loss is one of the most severe environmental problems. It manifests itself in the loss of species, habitats and ecosystems locally and globally. Switching to a plant-based diet reduces the impact of the Finnish diet on the global biodiversity loss, i.e. extinction of species. The impact on biodiversity loss can be assessed using various methods, of which the one focusing on land use is the most common. Based on this assessment method, the food products in the Finnish diet with the greatest impact on biodiversity loss are poultry, coffee, cocoa and chocolate. With poultry, this impact is mainly due to soy feed production in biodiversity-rich regions. Climate change also has an impact on global biodiversity loss, and its inclusion in the assessment significantly increases beef's impact on global biodiversity loss due to its high climate impact. These assessment methods do not directly indicate local impacts on Finnish biodiversity.

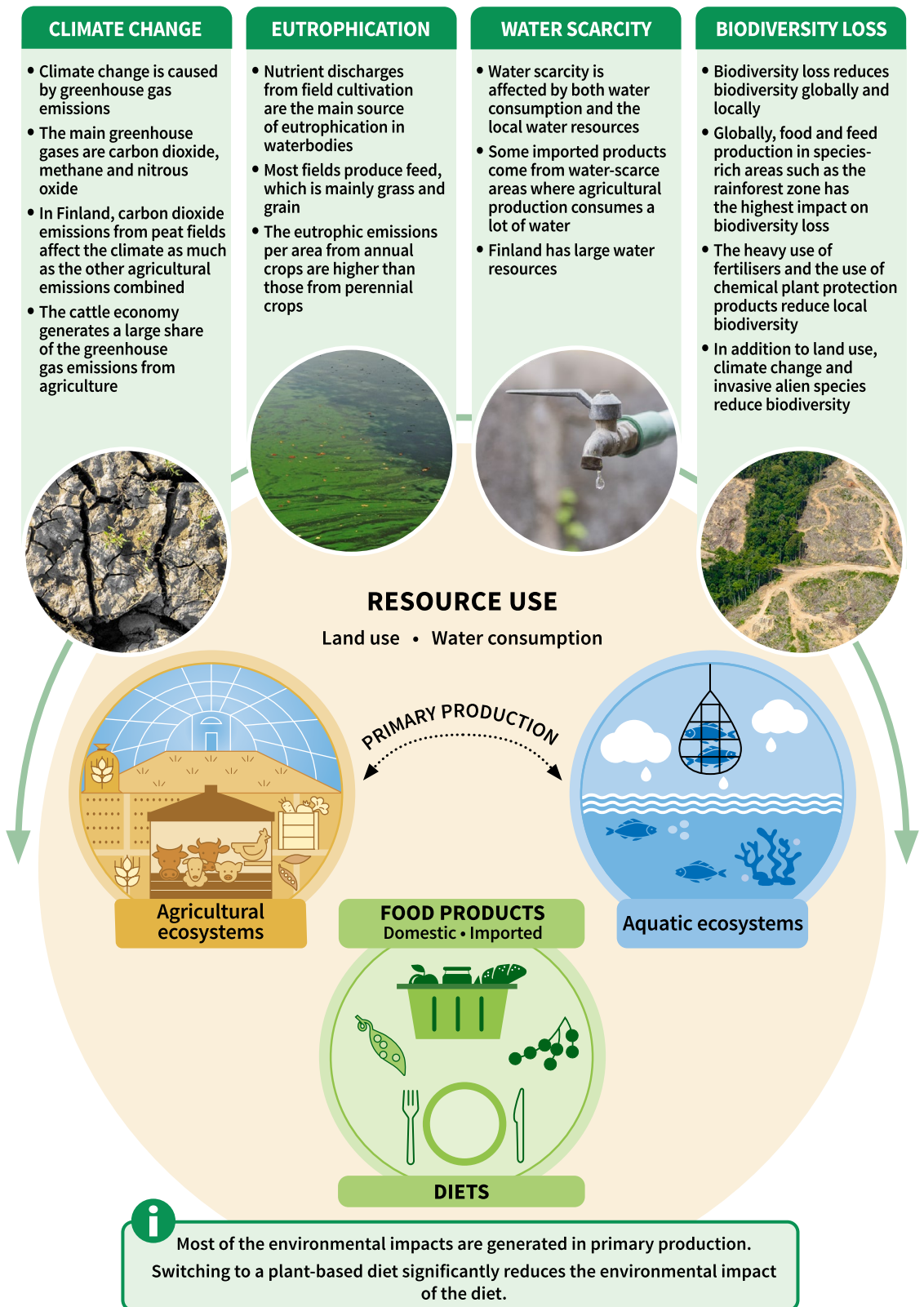
Diets and food products also have other local environmental impacts, which may also differ due to the origin of the products. For example, the water footprint that takes water scarcity into account is reduced for food produced in Finland because Finland's water resources are large. Conversely, in drier areas, agricultural water consumption can even lead to biodiversity loss due to water scarcity. However, the water footprint that takes water scarcity into account has only been assessed in a few food products.

## Food waste

Food waste causes unnecessary environmental impacts at all stages of the food system. Households are the most challenging and significant stage in reducing food waste. Even if household food waste was halved, it would reduce the climate impact of the food system in Finland by only a few per cent.

Food consumption exceeding energy requirements increases the use of resources in the food system and results in a greater negative environmental impact. Food consumption exceeding energy requirements is called metabolic food waste. In Sweden, for example, it is estimated that it can cause 10% of the greenhouse gas emissions of the food system. In Finland, the environmental impact of metabolic food waste has not been studied.





**Figure 7.** Environmental impacts of food production in agricultural and aquatic ecosystems and their association to food choices.

Healthy and  
environmentally  
sustainable food.



# NUTRITION RECOMMENDATIONS

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# Recommended intakes of energy and nutrients

- ▶ The following provides a brief overview of nutrient recommendations, focusing on energy and energy-yielding nutrients, as well as the vitamins and minerals for which recommendations have significantly changed or for which adequate intake poses challenges for Finns.
- ▶ More extensive justifications can be found in the Nordic Nutrition Recommendations.

## Energy and energy-yielding nutrients

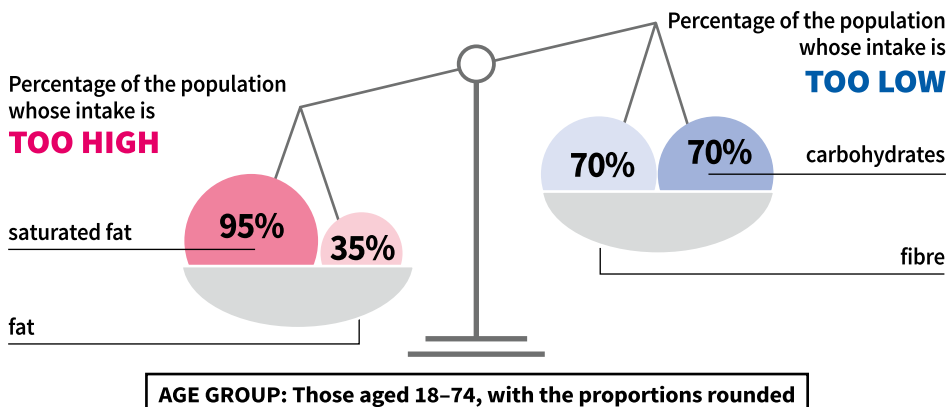
A long-term energy intake that exceeds or falls short of energy requirements is detrimental to health. The intake and expenditure of energy must be in balance in the long term. No recommendation has been specified for energy intake, as metabolic efficiency, body composition and physical activity vary significantly between individuals.

Theoretical reference values for energy intake have been established at population and group level. Their starting point is resting energy expenditure, which varies according to sex, age and weight. The weight used in the nutrition recommendations is based on average weights calculated according to the average height of the Nordic population to correspond to normal weight, i.e. a BMI of 23 kg/m<sup>2</sup>. If the energy intake reference values were calculated according to the actual weight of the population, they would support the maintenance of overweight and obesity. The physical activity level (PAL) also affects the energy requirement. The activity level factor of 1.6 corresponds to a lifestyle that includes sitting and some physical activity during leisure time. This activity factor has been used in the establishment of the nutrient intake reference values.

The daily energy requirement reference value is calculated using the resting energy expenditure and the physical activity factor. The reference value can be used in the planning of meal services and, with certain reservations, as a reliability measure in monitoring the population's nutrition intake. The reference values for energy intake and requirement by age and sex are presented in Appendices 5 to 7.

The function of energy-yielding nutrients is to ensure an adequate supply of energy and to support the functions of the body to maintain health. energy-yielding nutrients include carbohydrates, fibre, fat and protein, with an average energy value of 17 kJ/g for

carbohydrates and protein, 8 kJ/g for fibre and 37 kJ/g for fat. Alcohol contains 29 kJ/g of energy, but it is not included in the recommendation for energy nutrients because alcohol is not an essential nutrient. One kilojoule equals 0.239 kilocalories, and one kilocalorie equals 4.184 kilojoules.



**Figure 8.** Finns get too much saturated fat from their diet, while their intake of carbohydrates and fibre is low.

## Recommended intake of energy-yielding nutrients

The intake of energy-yielding nutrients is expressed as a percentage of the total energy intake (E%). The intake recommendations are presented as ranges based on research data on low chronic disease risk, adequate intake of essential nutrients and energy balance. The goal is that the majority of the population has intake of energy-yielding nutrients in accordance with the recommendations. The ranges are used in the overall assessment of nutrient intake. Alongside the ranges, it is important to consider the balance of energy-yielding nutrients, especially the adequate intake of fibre, unsaturated and essential fatty acids, and essential amino acids.

The proportions of energy-yielding nutrients are interdependent (Figure 8). When the proportion of one energy-yielding nutrient in the diet decreases, the proportion of another increases. For example, reducing fat in the diet must not lead to a preference for carbohydrate sources that are low in fibre and rich in free sugar. Similarly, reducing carbohydrate sources can easily lead to an increase in saturated fat and a lower fibre intake than recommended.

From the age of two, the recommended proportion of energy-yielding nutrients is the same for different age groups, with the exception of the minimum intake of protein for the elderly. When meal services are planned, the average of the lower and upper limits of the range is used. This means 52 to 53 E% for carbohydrates, 15 E% for proteins and 32 to 33 E% for fat. The recommendations regarding energy-yielding nutrients are summarised in Table 1. The recommended intakes of energy-yielding nutrients for different age groups are described in more detail in Appendices 8 and 9.

## Carbohydrates and fibre

The recommended intake of carbohydrates is 45 to 60% of the total daily energy intake (E%). The recommended intake of fibre is at least 3 g/MJ, i.e. at least 25 grams for women and 35 grams for men per day. The health effects of carbohydrates are linked to the quality and source of carbohydrates. Recommended sources of carbohydrates include whole grain cereals, vegetables, berries, fruits, legumes, nuts and seeds. Their abundant consumption ensures the recommended proportion of carbohydrates as a source of energy, as well as an adequate intake of fibre. The quality of carbohydrates is crucial: it is important to get enough fibre and avoid an excessive intake of free sugar. A high intake of free sugar decreases the overall quality of the diet and increases the risk of dental caries. The sugar obtained from fruit and berry juices and juice concentrates is also free sugar, which should be limited. By contrast, the sugars present in vegetables, berries and fruits eaten as such and used in cooking are not free sugar. The recommended intake of carbohydrates and fibre can be achieved with a varied plant-based diet rich in vegetables, berries, fruits and whole grains. A fibre-rich diet also contains health-promoting phytochemicals.

An adequate intake of fibre is associated with a lower risk of colorectal cancer, cardiovascular diseases and type 2 diabetes at the population level. A fibre-rich diet also reduces the risk of constipation, supports weight management and is beneficial for the intestinal microbiota. In Finland, the average daily fiber intake is 20 grams for women and 22 grams for men. Limiting the intake of added and free sugar helps to ensure an adequate supply of vitamins, minerals and fibre, and improves the nutrient density of the diet. It is especially important to limit it in children and adults with low energy intake.

## Fat

The recommendations for fat intake emphasise quality, that is, the fatty acid composition of the diet. The recommended fat intake is 25 to 40% of the total daily energy intake (E%). An inadequate fat intake can lead to an increased use of carbohydrate sources with a lower nutrient density and a lower intake of essential fatty acids. A low-fat diet can also have adverse effects, including on blood lipids and glucose metabolism. Since fat is high in energy, having a diet rich in fat can increase the risk of weight gain.

The intake of saturated fatty acids should be less than 10 E% and less than one third of the total fat intake. The proportion of unsaturated fatty acids should be at least two thirds of the total fat intake. Attention should be paid to the adequate intake of polyunsaturated fatty acids and that of essential fatty acids such as linoleic and alpha-linolenic acids in particular (Appendix 8). The proportion of trans fatty acids should be as small as possible. Replacing saturated fatty acids with poly- and monounsaturated fatty acids improves blood lipids, which is important in the prevention and treatment of cardiovascular diseases, for example.

## Protein

The recommended protein intake is 10 to 20 E%. This ensures an adequate intake of essential amino acids, including in plant-based diets using a wide range of protein sources. When the energy requirement is low (less than 8 MJ), it is also important to ensure an adequate intake of protein per kilogram of body weight, especially to ensure the intake of essential amino acids (including small, sedentary women, people aiming to lose weight and older people). Meal services for older people use an 18 E% target level, which corresponds to about 1.2 grams of protein per kilogram of body weight. This amount has been found to prevent the deterioration of functional capacity. Table 1 describes the recommendations for the intake of energy-yielding nutrients.

**Table 1.** Recommendations for the intake of energy-yielding nutrients<sup>1</sup> for the adult population and children over two years of age.

Energy-yielding nutrient	Recommended range	Target level to be used in planning <sup>2</sup>
Fat	25–40 E%	32–33 E%
Saturated fatty acids	< 10 E% <sup>3</sup>	
Monounsaturated fatty acids	10–20 E% <sup>3,4</sup>	
Polyunsaturated fatty acid	5–10 E% <sup>3,4</sup>	
– Essential fatty acids	≥ 3 E% <sup>3</sup>	
→ of which alpha-linolenic acid	≥ 0.5 E% <sup>3</sup>	
Carbohydrates	45–60 E%	52–53 E%
Fibre	≥ 3 g/MJ <sup>5</sup>	
Total free sugar	< 10 E% <sup>6</sup>	
Protein	10–20 E%	15 E% for people under 70 years and 18 E% (1.2–1.5 g/kg) for people aged 70 years and over

- 1 Energy from fibre, but not from alcohol, is also included in the calculation of energy intake.
- 2 Planning means the planning of meals offered in food services, for example.
- 3 Expressed as triglycerides, fatty acids make up around 95 %.
- 4 Monounsaturated and polyunsaturated fatty acids make up at least two thirds of the total fat intake.
- 5 With the reference energy intake, corresponds to at least 25 grams per day for women and at least 35 grams per day for men.
- 6 Free sugar includes sucrose, fructose, glucose, honey, syrups, starch sweeteners (glucose syrup, glucose-fructose syrups), sugar concentrates, other similar sugar preparations, fruit and berry juices and juice concentrates used as such or added to foods during preparation at home or in the food industry. The sugars present in vegetables, berries and fruits eaten as such and used for cooking are not included in the definition of free sugar.

## Vitamins and minerals

### Sodium (salt)

The recommended intake of sodium and salt derived from sodium is not based on the body's essential need but on reducing the risk of chronic diseases (CDRR = Chronic disease risk reduction). The sodium and the derived salt requirement for adults is 1.5 grams per day; which is significantly lower than the recommended intake. One gram of sodium is equivalent to 2.54 grams of salt. The recommended maximum intake of salt is less than 5 grams<sup>1</sup> per day. Women exceed the recommended salt intake by around one and a half times, and men by around twice. The most significant sources of salt are bread, pastries, meat and fish products, main dishes, convenience foods and salt used as such. A high salt intake increases the risk of premature death. It also increases the likelihood of high blood pressure, which in turn increases the risk of stroke and other cardiovascular diseases. A high salt intake is also harmful for those with normal blood pressure. It also increases the risk of cardiovascular diseases regardless of blood pressure, increases calcium excretion in the urine and may increase the risk of gastric cancer. The disadvantages of a high salt intake can be reduced by increasing the intake of potassium, which enhances the excretion of sodium through the kidneys. Good sources of potassium include vegetables, berries and fruits, potatoes, nuts and dairy products. An inadequate salt and sodium intake is extremely rare.

### Vitamin D

Among other things, vitamin D affects the functioning of body's tissues, calcium metabolism and the regulation of the immune system. Vitamin D has beneficial health effects, especially in the prevention of falls and bone fractures. Vitamin D deficiency leads to rickets in children and osteomalacia in adults. Vitamin D deficiency has also been associated with an increased risk of acute respiratory infections.

In Finland, vitamin D is synthesised in the skin under the influence of sunlight between March and October. As people age, the synthesis of vitamin D in the skin decreases. In the Finnish diet, the most important sources of vitamin D are fish and vitamin D-fortified dairy products and fat spreads. Finns' average intake of vitamin D from food and dietary supplements is 36 micrograms per day, of which the intake from food is 10 ug/day for women and 13 ug/day for men. Considering the total intake from food and dietary supplements, around seven per cent of both men and women do not meet the recommended vitamin D level. Infants, children, pregnant and lactating women, people wearing skin-covering clothing, people with dark skin, those spending very little time outdoors and older people are particularly susceptible to a insufficient vitamin D intake.

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<sup>1</sup> The recommendation for children's salt consumption can be found in the ['Eating together'](#) food recommendations for families with children.

The intake of vitamin D, both via synthesis in the skin and from food, is assessed by the concentration of the vitamin D metabolite, 25(OH)D, in the serum. The recommended intake of vitamin D is based on its skeletal effects, and a serum concentration of 50 nmol/l is considered adequate for health. The recommended intake of vitamin D from the age of two weeks is 10 micrograms per day. For older people ( $\geq 75$  years), 20 micrograms of vitamin D per day are recommended. The recommendations for dietary supplements is provided in Table 5.

### Vitamin E

The main function of vitamin E is to act as an antioxidant. Its sources include vegetable oils and spreads made of them, nuts, seeds and egg yolks. In Finland, the daily intake of vitamin E is 10.2 milligrams alpha-tocopherol equivalent (alpha-TE) for women and 11.8 milligrams alpha-TE for men.

Vitamin E deficiency is rare and often caused by long-term fat malabsorption due to genetic factors. The sufficient intake of vitamin E has been determined by considering the recommended intake of polyunsaturated fatty acids (5 to 10 E%). The sufficient intake of vitamin E is 9 to 10 milligrams alpha-TE per day for women and 11 milligrams alpha-TE per day for men. The vitamin E status can be measured by determining the plasma or serum alpha-tocopherol concentration.

### Vitamin C

Vitamin C functions as an antioxidant in the body. It is needed in collagen synthesis, for example, which affects the structures of cartilages, tendons, blood vessels and skin. In addition, it promotes the absorption of non-heme iron. The best dietary sources of vitamin C are fresh fruits, berries and vegetables. Potatoes also contain some vitamin C. The average daily intake of vitamin C is 111 milligrams and 98 milligrams in Finnish women and men respectively.

Individuals with low consumption of vegetables, berries and fruits, as well as smokers who have an elevated need for vitamin C, are at risk of an insufficient vitamin C intake.

The vitamin C status of the body can be measured by determining the plasma ascorbate concentration. The average adult requirement is defined so that the plasma ascorbate concentration reaches 50  $\mu\text{mol/l}$ . The recommended daily intake of vitamin C is 95 milligrams for women and 110 milligrams for men. Since smoking accelerates the use of vitamin C in the body, smokers' need for vitamin C is 40 milligrams per day higher than that of non-smokers.

### Folate

Folate is needed in the body in the synthesis of nucleic acids (DNA, RNA), for example. Folate is also involved in the conversion of homocysteine to amino acid

methionine. An adequate intake of folate is necessary for the production of red blood cells, for example. Its best sources are green leafy vegetables and whole grain cereal products. Legumes and liver are also rich in folate. Food preparation destroys 15 to 30% of folate in food. Folic acid is a synthetic form of folate obtained from dietary supplements. The average daily intake of folate is 222 micrograms in Finnish women, and 247 micrograms in men.

Folate deficiency manifests itself as macrocytic, megaloblastic anaemia. Risk groups for an insufficient folate intake are children, and pregnant and lactating women. An excessive consumption of alcohol increases the risk of folate deficiency.

The average folate requirement is based on folate levels of  $\geq 10$  nmol/l in serum and 340 nmol/l in red blood cells. The recommended intake for both women and men is 330 micrograms per day. The sufficient intake for pregnant women is set at 600 micrograms per day. For women of childbearing age, a dietary supplement of 400 micrograms of folic acid per day is recommended from the planning stage of pregnancy until the end of the 12th week of pregnancy to reduce the risk of neural tube defect in the foetus.

### **Vitamin B<sub>12</sub> (cobalamin)**

An adequate intake of vitamin B<sub>12</sub> is essential for normal development, nervous system function and red blood cells production. It is naturally found in foods of animal origin. The main sources are meat, eggs, dairy products, fish and liver. The average daily intake of vitamin B<sub>12</sub> is 6.6 micrograms in men and 4.9 micrograms in women.

The clinical signs (and symptoms) of vitamin B<sub>12</sub> deficiency include macrocytic megaloblastic anaemia and neurological dysfunction, such as muscle weakness and numbness, as well as cognitive dysfunction. Avoiding products of animal origin may lead to an insufficient intake of vitamin B<sub>12</sub> unless supplemented with a dietary supplement or foods fortified with vitamin B<sub>12</sub>. A special risk group are those who follow a vegan diet. In older people, a common reason for the decrease in vitamin B<sub>12</sub> levels is malabsorption caused by atrophic gastritis that atrophies the gastric mucosa, and medication such as metformin. Newborns are particularly susceptible to vitamin B<sub>12</sub> deficiency.

The vitamin B<sub>12</sub> status is reflected in serum and plasma vitamin B<sub>12</sub>, holotranscobalamin (holoTC), homocysteine (tHcy) and methylmalonic acid (MMA). However, all these have their limitations as independent biomarkers. The sufficient intake for both men and women is 4 micrograms per day.

### **Calcium**

Calcium is the most common mineral in the body. Among other things, it plays a key role in bone and dental health. Calcium decreases the absorption of iron, zinc and copper. The absorption of calcium is regulated by vitamin D. Sources of calcium

include dairy products, fish, cruciferous vegetables and foods fortified with calcium. Calcium is best absorbed from dairy products. The average daily intake in Finland of calcium is 1,182 milligrams for men and 984 mg for women.

Clinical signs of calcium deficiency include osteopenia, osteoporosis and fractures. A diet low in dairy products and an insufficient intake of vitamin D increase the risk of calcium deficiency. The risk groups for calcium deficiency include children, adolescents, young adults and menopausal women.

The body's calcium content is strictly regulated, and no reliable biomarker exists to measure the calcium status. The average requirement and recommended intake are based on balance studies as well as epidemiological and clinical studies on the role of calcium in maintaining healthy bones. The recommended intake is 950 milligrams per day for women and men.

## Iron

Iron binds oxygen to haemoglobin in red blood cells, which transports oxygen from the lungs to the tissues. Iron is also present in muscle myoglobin, which transports, stores and releases oxygen in the muscles. Sources of iron include meat and liver, whole grain cereal products and legumes. Animal-derived heme iron is well absorbed, while plant-derived non-heme iron is less readily absorbed. Vitamin C, proteins from meat, poultry and fish, as well as organic acids contribute to the absorption of non-heme iron. By contrast, polyphenols in tea, coffee, cocoa, wine and soy, phytate in cereals and calcium in dairy products reduce its absorption. The average iron intake is 10 milligrams per day in Finnish women and 11 milligrams per day in men.

Iron deficiency is common. In particular, infants, young children, women of childbearing age, pregnant women and those who follow a diet with little or no heme iron are at risk of iron deficiency. Iron deficiency causes iron deficiency anaemia. Its symptoms include fatigue, paleness, headache, increased heart rate and shortness of breath.

The recommended intake of iron is based on factor calculations of the balance of absorbed and excreted iron. Absorption is enhanced when iron stores are reduced. Understanding the iron status of the body requires the measurement of several biomarkers, including haemoglobin (B-Hb), serum ferritin (S-Ferritin), serum iron concentration (S-Fe), degree of transferrin saturation (P-TfFeSat) and transferrin receptor (S-TfR), and considering the inflammatory state of the body. For women, the recommended intake of iron is 15 milligrams per day from puberty to menopause, 8 milligrams per day after the end of menstruation, and 7 milligrams per day after the age of 70 years. For men, the recommended intake of iron is 9 milligrams per day.

## Iodine

Iodine is an essential constituent of the thyroid hormones thyroxine and triiodothyronine. Among other functions, these hormones are needed for growth and the development and functioning of the nervous system and cognitive functions. Good sources of iodine include fish, dairy products, iodised plant drinks, eggs and iodised salt.

The risk groups for iodine deficiency are those who consume few or no dairy and fish products. Those who consume seaweed products may get too much iodine. Both a deficient and an excessive iodine intake can cause thyroid dysfunction and thyroid diseases. Iodine deficiency and excess intake are also associated with infertility, pregnancy and childbirth complications, and cognitive development disorders in children.

An adequate intake of iodine for adults is 150 micrograms per day. It is based on the concentration of iodine in the urine, which minimises the increase in the volume of the thyroid gland.

## Selenium

The main function of selenium is to act as an antioxidant. In food, the content of selenium is strongly dependent on the content of selenium in the soil and the solubility of selenium. In the Nordic countries, the content of selenium is low in the soil. Selenium is added to fertilisers in Finland. The main dietary sources of selenium are cereal products (if produced in areas where the soil contains sufficient selenium), fish, meat, dairy products, nuts and eggs. The average daily intake of selenium is 68 micrograms in Finnish women and 88 micrograms in men.

Selenium intake may be too low if the diet is based mainly on organic products grown in selenium-poor soils. In a vegan diet, selenium intake may be insufficient if it mainly consists of organic products that have not been cultivated with a selenium-containing fertiliser.

The plasma selenoprotein concentration reflects the selenium status of the body and a sufficient intake is based on a plasma selenium concentration of 110 micrograms per litre. The adequate intake of selenium is 75 micrograms per day for women and 90 micrograms per day for men.

## Zinc

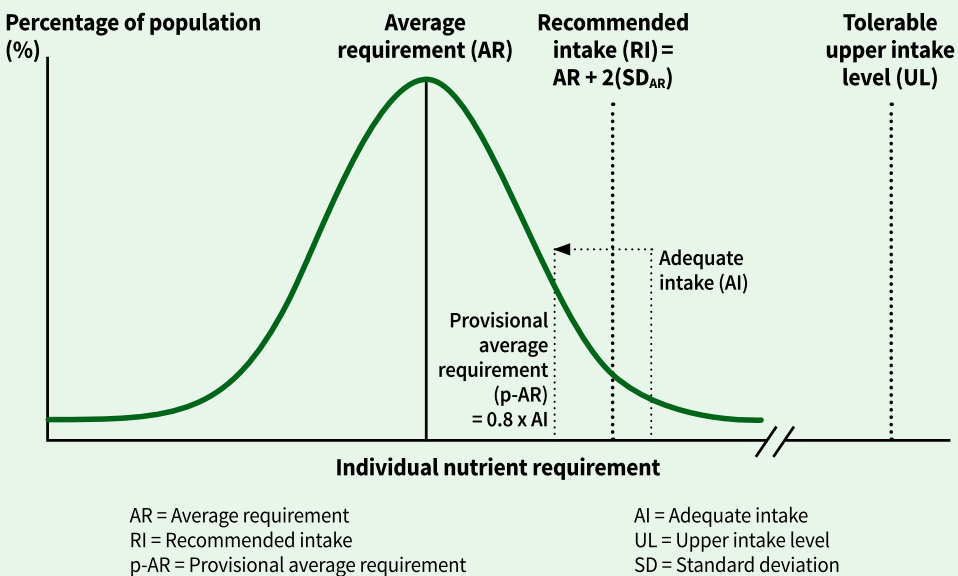
Zinc has essential functions in all human cells. It affects the activity of numerous enzymes in the body and is needed to regulate gene functions. In children, an adequate intake of zinc is important for growth. Zinc is present in both animal sources (meat, dairy products, eggs and liver) and plant products (legumes, cereals, nuts and seeds). Plant sources also include phytate and other compounds that inhibit the absorption of zinc, which is taken into account in the recommendations. The phytate content of legumes and cereals can be reduced by soaking, fermentation or germination, for example. Finns' average daily intake of zinc is 10 milligrams in women and 13 milligrams in men.

Zinc deficiency is rare in Finland. The intake of zinc may be insufficient in people who do not consume food of animal origin or eat small amounts of it.

The average requirement for zinc in adults is based on a physiological need proportional to body weight. The requirement depends on the absorption of zinc, which is influenced by the amount of zinc in the diet and the composition of the diet, especially the intake of phytate. The nutrition recommendation is based on a daily phytate intake of 600 milligrams. The recommended daily intake of zinc is 10 milligrams for women and 13 milligrams for men.

## Recommended nutrient reference values

Appendices 10 to 12 contain the dietary reference values for vitamins and minerals. The reference values for nutrient intakes and their intended use are presented in Appendices 5 to 12. The recommended intake is based on the average requirement for the nutrient, to which two standard deviations are added, whereby the intake covers the requirement for the nutrient of almost the entire population (97.5%) (Figure 9). The average requirement is defined by the dose–response relationship between the nutrient intake distribution and the biological marker reflecting the nutritional status, or by modelling the relationship between the intake and the physiological status. If such information is not available, an adequate intake is determined for the nutrient, which is a reference value slightly less certain than the recommended intake (Table 2).



**Figure 9.** The relation between the dietary reference values of vitamins and minerals, and the nutrient requirement in individuals.

For example, the average requirement for folate is 250 micrograms per day for women and men. This amount satisfies the requirement for half of the population and is used as a reference in population studies. Instead, the recommended intake of folate of 330 micrograms per day covers the requirement of almost the entire population and is used as a goal when designing diets for population groups. Specific recommendations have been established for children and pregnant and lactating women. If no comprehensive data are available about the population-level intake, or no reliable biomarker exists, to determine the average requirement, a provisional average requirement is determined for the nutrient, derived from the estimated adequate intake.

The nutrition recommendations include several changes compared to the previous 2014 recommendations. These changes are based on new research evidence and the alignment of age groups and reference values with the National Academies of Sciences, Engineering,

and Medicine (NASEM) and the European Food Safety Authority (EFSA). The average weight of the Nordic population used in the nutrition recommendations was updated to match the BMI of 23 kg/m<sup>2</sup> in all age groups. The reference values for both energy and nutrients were therefore set according to a healthy weight. These methodological reforms applied to all nutrients, but the changes in intake recommendations are relatively small. However, for nine nutrients, one or more intake reference values changed by more than 20% compared to the previous recommendations. The reference values increased for the following nutrients: vitamin E, vitamin B<sub>6</sub>, folate, vitamin B<sub>12</sub>, vitamin C, zinc, selenium and calcium. In contrast, the reference value for thiamine decreased.

**Table 2. Recommended reference values used in the Nordic countries.**

<b>Average requirement, (AR)</b>
The average requirement for a nutrient is the smallest amount of nutrient sufficient to meet the requirements of half (50%) of the population, assuming that the need for a nutrient is normally distributed in the population. Used to assess the average adequacy of nutrient intakes in the population.
<b>Provisional average requirement, (p-AR)</b>
Used when the average requirement cannot be formally defined. It describes the daily nutrient intake level that is estimated to meet the nutritional requirement of half (50%) of the population. It is usually an overestimate of the actual average requirement. Calculated by multiplying the adequate intake (AI) by 0.8.
<b>Recommended intake, (RI)</b>
The amount of nutrient that meets the nutrient requirements in almost all healthy individuals (97.5%), including variations in requirement in the general population. Used to plan diets for groups. Can be used as an indicative target for individuals.
<b>Adequate intake, (AI)</b>
Used when the recommended intake cannot be determined. It is based on an observed or experimentally determined nutrient intake estimate that is considered sufficient for a specific population group. It is a more uncertain reference value than the recommended intake, which is estimated to cover the requirement of almost the entire population.
<b>Tolerable upper intake level, (UL)</b>
The maximum long-term daily intake of the nutrient that is not expected to cause adverse effects for an individual. When intake exceeds the tolerable upper intake level for a long period of time, the risk of adverse effects of the nutrient intake increases.
<b>Energy intake and requirement reference values</b>
Reference values have been set for energy intake for children and adults by sex and age group, which take physical activity into account.
<b>Recommended intakes as ranges of the proportion of energy intake (E%)</b>
The recommended intakes of energy-yielding nutrients (carbohydrates, protein, fat) are expressed as ranges of their proportion of energy intake (E%). The recommended intake is associated with a lower risk of chronic diseases and ensures an adequate intake of essential nutrients when the energy intake is in line with the requirement.

## Recommended food choices

- ▶ **Food-based dietary guidelines focus on the nutritional adequacy and health effects of diets, and all the quantitative recommendations are based on them.**
- ▶ **Food-based dietary guidelines emphasise the importance of plant-based foods in terms of both health and the environment.**

The health effects of a diet are determined by its components. In addition to essential nutrients, the health-promoting effects of diets are also based on other beneficial compounds. These include polyphenols such as flavonoids, which are abundant in berries, for example. If the consumption of an individual food group is reduced, it usually means that the consumption of another food group must be increased to balance energy and nutrient intake. Food group-specific instructions should therefore always be considered in relation to the diet as a whole.

Food processing and preparation methods affect the nutrient content of foods and the absorption of nutrients. However, the degree of processing does not directly determine the health effects of food. The current international classification of ultra-processed foods is not fully applicable to the Finnish selection of food products. Foods rich in free sugar, salt and saturated fat and low in fibre, vitamins and minerals should be used as little as possible, regardless of the method of their preparation.

The following sections describe the dietary guidelines for various food groups, including the nutrient contents, current consumption, health effects and environmental impact of each food group. The first food to be introduced is breast milk – the initial source of nutrients in the life course.

The methodology for creating health-promoting and environmentally sustainable food-based dietary guidelines is outlined in Appendix 13.

## Breastfeeding and introduction of complementary foods

**Definition:** Exclusive breastfeeding refers to breast milk as the sole source of infant nutrition. Partial breastfeeding means that the infant receives infant formula or solid food in addition to breast milk.

**Breastfeeding in Finland:** In Finland, infants are breastfed for an average of seven to eight months, of which exclusive breastfeeding lasts for around two months. In 2019, 59% of newborns had received supplementary milk in the maternity hospital. In Finland, the differences in the prevalence of exclusive breastfeeding and total breastfeeding are considerable between population groups. Factors that increase the likelihood of short breastfeeding include young age, low education, foreign background and smoking of the mother and spouse, as well as primiparity and caesarean section.

**Nutrient content and health effects:** Breast milk meets the nutritional requirements of a full-term infant during the first six months, with the exception of vitamin D. Breastfeeding has a beneficial effect on the child's growth and the development of their central nervous and immune system. Breastfeeding protects the child from infections, overweight and obesity and has a positive association with cognitive skills. Breastfeeding helps the mother to reach their normal weight after pregnancy and protects them against breast and ovarian cancer, and type 2 diabetes. In infants under one year of age, breastfeeding may protect teeth from cavities compared to breastmilk substitutes. The introduction of varied complementary foods in tasting portions between 4–6 months of age, concurrent with breastfeeding, supports intestinal maturation and the development of food tolerance. The 'Eating together' (Syödään yhdessä) food-based dietary guidelines for families with children provide more detailed instructions for introducing different complementary foods.

**Environmental impact:** Breast milk has a very low environmental impact compared to infant and follow-up formula.



### RECOMMENDATION

- Exclusive breastfeeding is recommended for the first four to six months, after which breastfeeding should be continued along with complementary foods until about one year of age.
- If breastfeeding is not possible, the use of infant formula and follow-up formula is recommended.
- Introduction of complementary foods begins with small taste portions of vegetables, berries and fruits at the age of four to six months.
- It is advisable to expand the diet by including cereal products, fish, meat and eggs at the age of five to six months.
- Legumes can be gradually introduced in small portions from 6 months of age.

## Cereals and cereal products

**Definition:** Cereals include edible grass seeds such as wheat, rye, oats, barley, rice and maize. The definition also includes so-called pseudocereals such as amaranth, buckwheat and quinoa, the seeds of which are used in the same way as cereals. Whole grains are intact, flattened, broken or ground grains from which inedible parts have been peeled off. The proportions of the main structural components of the grain, i.e. the endosperm, germ and bran, are the same as in an intact grain. Cereal products also include more highly processed cereals, from which the bran, rich in fibre, vitamins and minerals, has been removed. More highly processed cereals are low in fibre, but they retain the starch and most of the protein present in the cereal.

Whole grain products are defined as food products in which whole grain cereals are the main ingredient, and in which they account for at least 50% of the dry weight of the product. Many whole grain products also contain refined low-fibre grain as an ingredient for taste and better baking properties.

**Nutrient content and consumption:** Cereal products are an important source of energy, carbohydrates, fibre and proteins, and they also provide vitamin E, thiamine, folate, iron and zinc. In addition, whole grain cereals contain phytochemicals that have a positive effect on health. If the cereals used as ingredients for cereal products have been grown in selenium-rich soil, or selenium has been added to the fertilisers, the cereal products are also a good source of selenium. Organic fertilisers do not contain added selenium, and organic cereal products are therefore a poorer source of selenium.

Whole grain products have a higher nutrient density and a lower energy density than products made from refined low-fibre grains. On average, Finnish women consume 111 grams of cereals, and men 149 grams per day (Figure 9). About half of this amount is refined low-fibre wheat. The main whole grain cereals used in Finland are rye and oats, and their main food sources are rye bread and porridges. Gluten-free cereal products are important for people with celiac disease or other gluten tolerance disorders.

**Health effects:** At the population level, the intake of whole grains is associated with lower overall mortality and a lower risk of colorectal cancer, cardiovascular diseases and type 2 diabetes. The use of whole grains is also associated with a lower body weight, total cholesterol and systolic blood pressure.

**Environmental impact:** Cereal products are a key product group in environmentally friendly diets. Most cereals have relatively low environmental impacts. It is recommendable to use a variety of cereals, as the cultivation of several species supports sustainable agriculture and biodiversity. The environmental damage caused by whole grains is smaller than that caused by more highly processed cereals. The climate impact of rice, which is cultivated in water, is much higher than that of most other cereals. The water footprint of rice is especially high if it comes from water-scarce areas.

## RECOMMENDATION

- Cereal products should mainly be whole grains with a recommended intake of at least 90 grams of whole grains per day (dry weight) (Picture 1).
- Low-salt alternatives should be preferred in all cereal products.
- The fibre content of soft breads should be at least six grams per 100 grams, and that of dried breads at least ten grams per 100 grams.
- Low-fibre cereals should be used in moderation.
- Cereal products are key foods and sources of energy in the transition to more environmentally sustainable diets.
- Replacing rice with other whole grains for environmental reasons is recommended.



**Picture 1.** The picture shows a plate of oatmeal, 3 pieces of whole grain rye bread and a generous deciliter of boiled barley. In total, they contain the recommended daily amount, i.e. 90 g of whole grains.

## Vegetables, berries and fruits

**Definition:** In food-based dietary guidelines, vegetables refer to vegetables, root vegetables and mushrooms. Potatoes and legumes have their separate guidelines and are not included in the guidelines for vegetables. Vegetables include cruciferous vegetables (e.g. various types of cabbage), leafy vegetables and yellow, orange, red and dark green vegetables. Root vegetables include plants whose edible part is the root or the lower part of the shoot, such as carrot, swede, turnip, beetroot and radish. Berries include i.a. blueberry, strawberry, raspberry, cloudberry, cranberry, lingonberry, currants, sea buckthorn, gooseberry and aronia berries. Fruits include i.a. citrus fruits (e.g. oranges, satsumas), bananas, stone fruits (e.g. nectarines, plums), apples and pears.

**Nutrient content and consumption:** Vegetables, berries and fruits are usually high in water and low in energy and are good sources of fibre, vitamin C, vitamin E, vitamin K, folate and potassium. They also contain phytochemicals that are beneficial to health. Cruciferous vegetables such as cabbage plants and turnips are sources of calcium. Leafy vegetables such as spinach and lettuce contain iron, zinc, calcium, magnesium, folate and carotenoids. Dark green vegetables and carrots are rich in carotenoids. Root vegetables are a good source of fibre. Berries are a major source of polyphenols. Only about one in five Finnish adults achieves the daily recommended intake of vegetables, berries and fruits (at least 500 grams per day).

**Health effects:** An abundant consumption (500 to 800 grams per day) reduces the risk of multiple cancers, cardiovascular diseases and mortality. There is evidence to suggest that phytochemicals have protective effects against chronic diseases. A diet low in vegetables, berries and fruits is a significant dietary risk factor for chronic diseases in the Nordic countries.

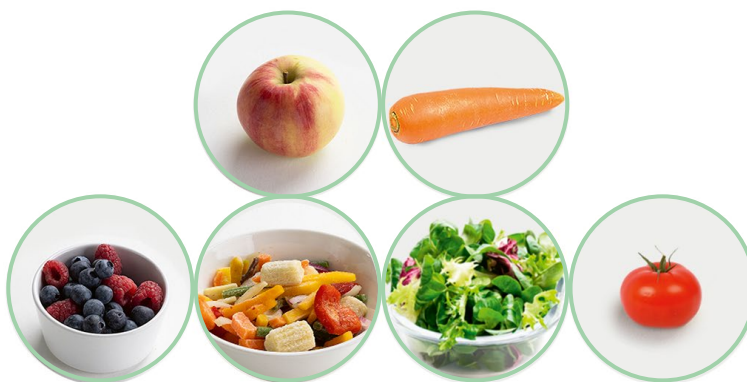
**Environmental impact:** Vegetables, berries and fruits are a key food group in environmentally friendly diets. Most of them have relatively small climate impacts, and this is especially the case with root vegetables, cabbages and onions grown outdoors, as well as wild berries. Plant protection products can be used in the production of vegetables, berries and fruits, which can have a negative impact on biodiversity. In many importing countries, plant protection products are used more than in domestic production. Some fruits and vegetables are imported from areas where water is scarce, which may make the water footprint of these products very large when water scarcity is taken into account.

## RECOMMENDATION

- Consuming a wide variety of vegetables, berries and fruits – at least 500 to 800 grams per day, which correspond to about five to nine servings-\*, is recommended (Pictures 2 and 3).
- About half of the recommended amount should be vegetables and root vegetables, and the rest should be berries and fruits. These are recommended to be consumed uncooked, cooked and as ingredients for various foods.
- Frozen vegetables and berries are good alternatives\*\*.
- Sweetened or salted products are not recommended. A small amount of fruit juice (1 dl) may make up part of the recommendation for berries and fruits for adults.

\* For example, a serving consists of 1.5 decilitre of lettuce or grated or steamed vegetables, 1 decilitre of berries or one medium-sized fruit.

\*\* Safe use of frozen vegetables and berries. See the instructions for the safe use of food on the Finnish Food Authority website. (<https://www.ruokavirasto.fi/en/foodstuffs/instructions-for-consumers/safe-use-of-foodstuffs/>)



**Picture 2.** An example of 500 grams or five to six servings of vegetables, berries and fruits.



**Picture 3.** An example of 800 grams or eight to nine servings of vegetables, berries and fruits.

## Potatoes

**Nutrient content and consumption:** Potatoes contain a moderate amount of carbohydrates and protein. The consumption of potatoes ensures an adequate intake of several vitamins and minerals, including vitamin C, vitamin B<sub>6</sub>, niacin, folate, potassium and phosphorus. Potatoes also contain phytochemicals such as phenols and carotenoids. The average daily consumption of potatoes is 62 grams for women and 85 grams for men.

**Health effects:** The positive health effects of potatoes are related to their key role in ensuring an adequate intake of a number of vitamins and minerals. Deep fried potatoes and dishes rich in saturated fat and salt are not recommended. Potato crisps contain degraded starch, which sticks easily to teeth causes a long-lasting acid attack.

**Environmental impact:** Potatoes are a good choice for a diet that has as little impact on the climate as possible. Potato thrives in the Finnish climate and has a high yield, and potato cultivation therefore requires relatively little arable land and has a low climate impact.

### RECOMMENDATION

- Potatoes are a recommended part of a healthy and environmentally friendly diet.
- High-fat and salty potato dishes should be avoided.



## Legumes and legume products

**Definition:** Legumes belong to the family of leguminous plants. The most commonly used legumes are peas, beans and lentils. Bean species include i.a. soybean, broad bean, kidney bean, white bean, brown bean, black bean, pinto bean and lima bean. In these guidelines, legumes do not include coffee and cocoa beans, peanuts are included in nuts, and beans consumed with their pods such as green beans are included in vegetables.

**Nutrient content and consumption:** Legumes and legume products are high in protein, making them a good alternative to animal protein. Soy and many legume products that include a variety of legumes or other plant-based protein sources contain all the essential amino acids. Most individual legumes, on the other hand, do not contain an adequate amount of all the essential amino acids. For this reason, it is important to include whole grains, nuts and seeds in the diet, especially if the diet does not include foods of animal origin. Legumes are a good source of fibre. Vitamin and mineral contents vary by species, but most legumes contain thiamine, folate, potassium, iron, magnesium, zinc and various phytochemicals. In Finland, the consumption of legumes is low: on average, women consume 13 grams per day, and men 12 grams per day.

**Health effects:** The consumption of legumes is associated with lower levels of risk factors for chronic diseases. In addition, high-fibre foods, including legumes, can reduce the risk of colorectal cancer and overall mortality. The effects of harmful substances present in legumes, such as phytate, tannins and lectins, can be eliminated by proper cooking methods, including soaking, boiling and fermentation. Legumes contain galacto-oligosaccharides, which can cause symptoms in people with sensitive stomachs. Legumes can be introduced gradually in small amounts and by trying different varieties.

**Environmental impact:** Legumes are a good choice for an environmentally friendly diet. In general, soybean intended for direct human consumption is an environmentally friendly choice, as it is not associated with the environmental problems of increasing large-scale production, such as tropical deforestation related to the cultivation of soy used for animal feed. Legumes maintain soil fertility and biodiversity. They bind atmospheric nitrogen to the soil and thus reduce the need for nitrogen fertilisers. Legumes are a key part of organic crop rotations. The range of legumes that thrive in Finnish farming conditions is so far limited, which is why the increased use of legumes will increase their imports, especially in the short term. In the longer term, however, efforts can be made to expand the range of legumes suitable for Finnish cultivation conditions through varietal breeding and the development of cultivation methods.



## RECOMMENDATION

- Legumes are a good choice for health and the environment.
- It is advisable to gradually increase their consumption by varying different types.
- Limited research data are available to determine a precise quantitative recommendation for intake. Based on preliminary research evidence and international food-based dietary guidelines, a daily intake target of 50 to 100 grams (cooked) is recommended.\*

\* For example, one decilitre of frozen peas weighs 60 grams, one decilitre of boiled white beans 70 grams, and one decilitre of cooked lentils 80 grams.



**Picture 4.** Examples of legume servings of 50 to 100 grams: one decilitre of boiled beans, peas or lentils weighs around 50 to 100 grams.

## Nuts and seeds

**Definition:** Nuts and seeds include tree nuts, peanuts and seeds. Commonly used nuts and seeds include peanuts, hazelnuts, almonds, pecans, walnuts, cashews, Brazil nuts, pistachios, sesame seeds, chia seeds, hemp seeds, pine nuts, pumpkin seeds, sunflower seeds and linseed.

**Nutrient content and consumption:** Nuts and seeds are rich in energy due to their high fat content. The fat is mainly recommended unsaturated fat. Nuts and seeds are also rich in protein, fibre, vitamin E, magnesium, selenium, zinc and phytochemicals. The nutrient content of nuts varies by type. Walnut is the only nut that contains significant amounts of alpha-linolenic acid, an n-3 fatty acid. Brazil nuts are very rich in selenium. Therefore, they should not be eaten on a regular basis for more than two to three nuts per day. The average consumption of nuts is seven to nine grams per day.

**Health effects:** A regular consumption of nuts reduces the risk of cardiovascular diseases, cancers and mortality and can protect teeth from caries. Nuts can cause severe allergic reactions to people with nut allergies. Oilseeds naturally accumulate heavy metals in the soil. The website of the Finnish Food Authority therefore provides specific [instructions](#) for the safe consumption of seeds.

**Environmental impact:** Nuts and seeds are a good choice for a diet with a small climate impact. The water footprint that takes water scarcity into account is relatively large for some nuts because they come from water-scarce areas. In some production areas, water shortages also affect the production of nuts. Peanuts generally have a smaller water footprint than tree nuts and almonds. Nuts and seeds are mainly imported products, and no comprehensive information is available about their environmental impact in the importing countries. Detailed information concerning the environmental impact of domestic seeds is also limited, but in general they diversify farming and thus support biodiversity, soil carbon stock and soil fertility.



### RECOMMENDATION

- Consuming 20 to 30 grams or two to three tablespoons of unflavoured nuts daily, depending on the type of nuts, is recommended.
- It is also good to include a variety of different seeds in the diet.

## Fish

**Definition:** Fish includes lean and fatty fish species as well as shellfish, such as crayfish.

**Nutrient content and consumption:** Fish is a key source of high-quality protein, n-3 fatty acids and vitamin D. A regular consumption also ensures an adequate intake of vitamin B<sub>12</sub>, iodine and selenium. Long-chain omega-3 fatty acids, i.e. eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are found especially in fatty fish such as salmon, rainbow trout, char, vendace, herring and whitefish. The average daily consumption of fish and seafood is 27 grams for women and 36 grams for men. Fish oil supplements are not an adequate substitute to produce the health benefits of fish.

**Health effects:** The health effects of fish are mainly related to the high-quality fat content, but other nutrients are also important. Eating fish protects against cardiovascular diseases, mortality and the deterioration of cognitive functions. The maternal consumption of fish during pregnancy is positively associated with the child's cognitive development. The Finnish Food Authority website [instructions for the safe use of foodstuffs](#) provides guidance on the recommended use of fish and fish species.

**Environmental impact:** Even a high consumption of fish can be part of a sustainable diet if the fish species are chosen responsibly. The fishing methods, the viability of the fish stock and the production methods of farmed fish affect the environmental impact of fish. In Finland, wild fish is generally a good alternative in terms of the environment. For example, the fishing of cyprinids and other small fish removes nutrients that cause eutrophication from the Baltic Sea and lakes. Ecologically sustainable fish species currently include perch, pike, smelt, vendace, roach and bream, but the viability of the fish stock may change over time. Farmed fish have a greater climate impact than wild-caught fish due to the feed used in farming. Norwegian farmed salmon, which is widely used in Finland, can spread diseases and parasites to wild fish in its rearing areas and cause eutrophication in water systems. The WWF Fish Guide and the Marine Stewardship Council (MSC) and Aquaculture Stewardship Council (ASC) sustainable fish labels help select sustainable fish and shellfish. The MSC label applies to wild fish and shellfish, and the ASC label applies to farmed fish and shellfish. However, not all fishing companies that meet the criteria are MSC or ASC certified.

### RECOMMENDATION

- It is advisable to eat 300 to 450 grams of fish (cooked, edible part) per week, varying between different fish species and favouring sustainably caught or farmed alternatives. Of this amount, at least 200 grams per week should be fatty fish such as wild vendace and bream.

## Red meat

**Definition:** Red meat refers to the meat of cattle, pigs, sheep, goats, deer, reindeer and moose, as well as their organs. Processed meat refers to sausages, and cold cuts made from all types of meat.

**Nutrient content and consumption:** Red meat contains high-quality protein, iron in a highly absorbable form (heme iron), zinc and B vitamins (thiamine, riboflavin, vitamin B<sub>6</sub> and vitamin B<sub>12</sub>). It is also a major source of saturated fatty acids that are harmful to health. Pork has a better fatty acid composition than beef and lamb. Processed meat is a source of salt, saturated fat, nitrite and phosphate. In Finland, the average weekly consumption of red and processed meat is 760 grams for men and 390 grams for women. Of this, the weekly consumption of processed meat is 400 grams for men and 200 grams for women.

**Health effects:** Both unprocessed and processed red meat are risk factors for colorectal cancer. Processed meat is classified as carcinogenic to humans, and red meat is also likely to be carcinogenic to humans. A diet rich in red and processed meat has also been associated with a higher risk of cardiovascular diseases. In Finland, a diet rich in red meat is one of the biggest dietary risk factors causing the loss of disability-adjusted life years.

**Environmental impact:** An ecologically sustainable diet can contain a moderate amount of red meat. However, to reduce the climate impact of the Finnish diet, it is important that the average consumption of beef is significantly reduced. In terms of the environment, it is also important how the meat is produced. In combined production of milk and beef, the climate impact of beef is clearly lower than in specialised beef production, although it is still large compared to other foods when produced this way. The majority of domestic beef on the market comes from combined production. In Finland, the production of beef and lamb is often based on grazing, which promotes biodiversity. Imported beef is often associated with overgrazing, which is not the case in Finnish production.

The climate impact of pork is significantly lower than that of beef. On the other hand, pork production has no grazing-related positive effects on local biodiversity, as beef production may have. In Finland, by-products of food production, which cannot be directly used for human consumption, are used extensively to feed pigs, whereas soy feed is only used to a small extent or not at all. The cereals used as feed in animal production are also often unsuitable for direct food production. Imported pork production generally uses more soy, which has significant environmental impacts in the countries of production. Little information is available about the environmental impact of game animals.

## RECOMMENDATION

- For health reasons, a maximum of 350 grams of cooked beef, pork and lamb is recommended per week (approximately 500 grams of raw meat) of which the amount of processed meat should be as low as possible.
- Processed red meat should be used as little as possible.
- When choosing meat, low-fat alternatives are recommended to reduce the intake of saturated fat.
- For environmental reasons, the consumption of red meat should be considerably lower than 350 grams per week at the population level.
- The reduced meat consumption should primarily be replaced by plant-based food such as legumes and whole grain cereals, or sustainably caught and farmed fish.

## Poultry

**Definition:** Poultry mainly refers to chicken, turkey and duck. Processed poultry meat means sausages, and meat and sausage cold cuts.

**Nutrient content and consumption:** Poultry not only provides high-quality protein, iron and several B vitamins but also has a more beneficial fatty acid composition than red meat. Processed poultry is a significant source of salt. The consumption of poultry has increased in recent decades and is the main reason for the increase in total meat consumption. The average weekly consumption of unprocessed, cooked poultry meat is 210 grams for men and 170 grams for women.

**Health effects:** There is no evidence of beneficial or harmful effects of poultry on the risk of chronic diseases. Processed meat, including processed poultry, is a risk factor for colorectal cancer.

**Environmental impact:** An ecologically sustainable diet can contain a moderate amount of poultry. Due to the high consumption volume, poultry is one of the most biodiversity-destroying foods in the Finnish diet. The soy feed used in poultry meat production weakens biodiversity at the global level, as the cultivation of soybean for feed is accompanied by land use changes, meaning that new areas are introduced for cultivation in warm and species-rich areas that are particularly favourable to soybean cultivation. Finnish poultry production mainly uses certified soy that does not come from new farming areas. However, the use of certified soy also increases the total demand for soy on the world market and thus contributes to the introduction of new farming areas. It is difficult to replace soy in poultry feed, but the Finnish poultry industry is actively looking for and developing alternatives to it. The climate impact of poultry is significantly lower than that of beef. A third of the climate impact of Finnish poultry is caused by soy feed.

## RECOMMENDATION

- Processed poultry should be consumed as little as possible.
- Reducing the consumption of poultry from the current amount due to its environmental impacts is recommended.
- The reduction of red meat consumption should not be replaced by poultry meat.

### Long-term target for red meat and poultry consumption

To significantly reduce the environmental impact of food consumption, the consumption of meat must be reduced from the current level. If the total consumption of red meat and poultry is limited to 350 grams per week, the impact of the diet on the climate and biodiversity will be reduced by at least 10% compared to a situation in which the consumption of red meat is 350 grams per week, and the consumption of poultry remains at the current level.

Based on the modelling underlying these recommendations, a reduced meat consumption or a meat-free diet does not pose a nutritional risk if the diet is varied and compiled according to the nutrition recommendations. Based on this, the long-term target for the consumption of red and poultry meat is a maximum of 350 grams per week.

## Milk and dairy products

**Definition:** Dairy products include milk, buttermilk, yogurt, curd milk, quark, cheeses and other dairy products.

**Nutrient content and consumption:** Milk and dairy products are a major source of protein, calcium, iodine, riboflavin, vitamin B<sub>12</sub> and vitamin D. Milk contains high-quality protein due to its amino acid composition. Fatty dairy products are also a significant source of saturated fat, as around 70% of milk fat is saturated, and

cheese is also a source of salt. On average, women consume dairy products 394 grams per day, and men 480 grams per day. Of this, the proportion of cheese is 37 grams and 44 grams respectively.

**Health effects:** Among other benefits, replacing fatty dairy products with fat-free and low-fat products reduces the risk factors for cardiovascular diseases, that is, the total and LDL cholesterol levels in the blood. Dairy products, especially fat-free ones, also help protect against colorectal cancer.

**Environmental impact:** A moderate amount of dairy products can be part of an environmentally sustainable diet. Due to their high consumption, dairy products are a significant product group in terms of both the environment and nutrition. The climate impact of cheeses is clearly greater than that of liquid dairy products. Dairy production is linked to beef production because they share production stages. The environmental impact of these products must therefore also be considered jointly and at the level of the production system of the whole cattle economy. It involves both beneficial and harmful features, including methane emissions typical of ruminants (see Appendix 4). At the same time, the cattle economy makes use of grasslands, which have a positive environmental impact compared to annual crops.



## RECOMMENDATION

- A daily consumption of 350 to 500 grams of fat-free or low-fat dairy products is sufficient to satisfy the requirement for calcium, iodine and vitamin B<sub>12</sub> if the diet also includes legumes, dark green vegetables, fish, nuts and seeds.
- Milk and buttermilk should be fat-free or contain no more than 0.5% fat.
- Yogurt, curd milk and quark should be fat-free or contain no more than 1% fat and no or little free sugar.
- Choosing cheeses with less salt (up to 1.2%) and up to 17% fat is recommended. Depending on the type of cheese, 10 to 20 grams of cheese is equivalent to around 100 grams of milk.
- Plant-based beverages and other plant-based food products fortified with calcium, vitamin D, iodine and vitamin B<sub>12</sub> should be preferred as alternatives to milk.

## Eggs

**Nutrient content and consumption:** Eggs contain good-quality protein and all the essential nutrients except for vitamin C. The consumption of eggs by Finnish men and women is about 24 grams per day, which corresponds to about half an egg per day. Part of the egg intake comes from dishes containing eggs.

**Health effects:** A high consumption of eggs can increase blood LDL cholesterol levels. Up to one egg per day can be part of a health-promoting diet.

**Environmental impact:** A moderate number of eggs can be part of an ecologically sustainable diet. Egg consumption is not a significant factor in the environmental impact of diets.

### RECOMMENDATION

- A moderate egg consumption, i.e. up to one egg per day including eggs used in cooking and baking., can be part of a healthy and environmentally friendly diet.\*\*

\* This applies to people who do not have an arterial disease, diabetes or an elevated blood LDL cholesterol.



## Dietary fats

**Definition:** Dietary fats are fats of animal or vegetable origin or their mixtures which are used in cooking or as such. Spreadable fats include butter, fat blends, margarine and vegetable fat spreads. Their fat content ranges from 35 to 80%. Vegetable oils contain 100% fat.

**Nutrient content and consumption:** Dietary fats are key sources of essential fatty acids (linoleic acid and alpha-linolenic acid) and fat-soluble vitamins. Finns consume butter and butter and vegetable oil blends more than margarines, vegetable fat spreads and vegetable oils. This is part of the reason why the total intake of saturated fatty acids exceeds the recommended intake (less than 10 E%) in almost the entire population. Children mostly consume plant-based fat spreads in day care.

**Health effects:** Replacing saturated fatty acids with polyunsaturated fatty acids is beneficial for heart health and protects against type 2 diabetes. The use of vegetable oils protects against cardiovascular diseases, type 2 diabetes, certain cancers and premature mortality. Compared to other dietary fats, the use of butter and tropical oils (coconut, palm, palm kernel and shea oil) increases blood LDL cholesterol, and the use of canola oil decreases it. A diet low in n-3 fatty acids is a significant risk factor for chronic diseases in the Nordic countries.

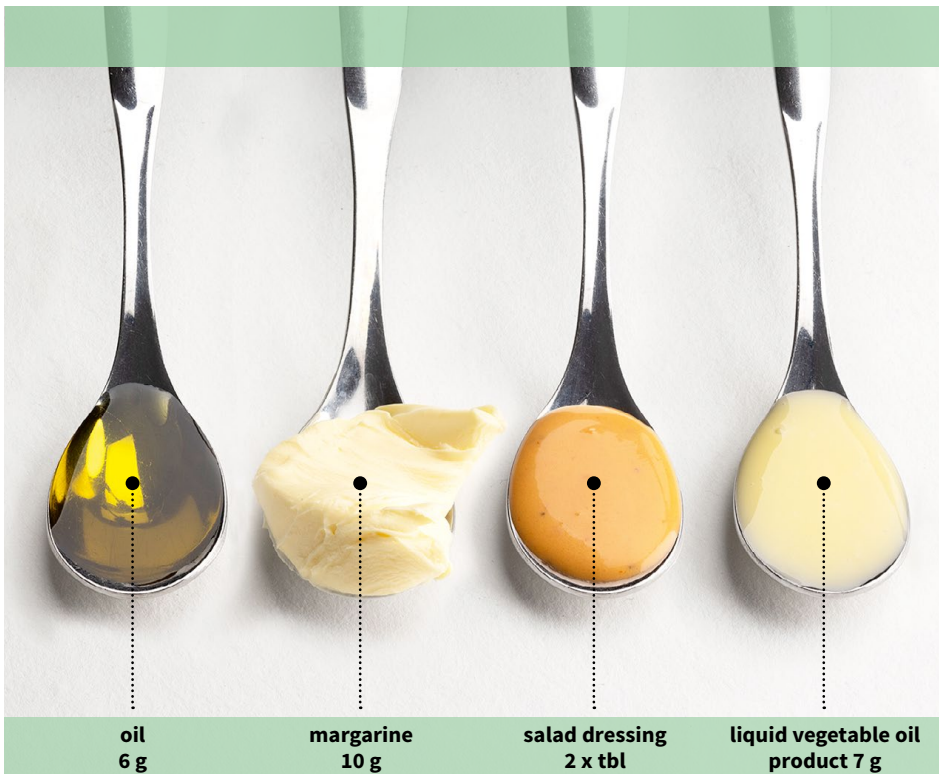
**Environmental impact:** Vegetable oils and dietary fats do not significantly affect the environmental impact of diets. However, there are differences in the environmental impacts of different fats and oils at the product level. Butter has the highest climate impact. Of the most commonly used dietary fats, canola, olive and sunflower oils have the lowest climate impact. The production of palm oil is a major cause of deforestation in its production countries. It involves changes in land use, i.e. the introduction of new production areas, and palm oil therefore has the highest impact on the climate and global biodiversity among vegetable oils. Certified palm oil comes from older production areas that do not involve recent land use changes. However, the total demand for palm oil is growing globally, which means that the production areas are also growing. The production potential of palm oil, i.e. the production volume per hectare, is the highest among vegetable oils. The production of olive oil and sunflower oil uses the greatest amount of land and water, whereas the production of canola oil requires a lot of fertilisers but, as a flowering plant, it supports biodiversity.



## RECOMMENDATION

- A minimum of 25 grams of vegetable oils should be used daily to ensure an adequate alpha-linolenic acid intake\*.
- The use of butter and tropical oils should be limited, and preference should be given to vegetable oil based spreads with at least 60% fat and high in unsaturated fatty acids.

\* An adult with an average daily energy intake of 10 MJ should get at least 1.3 grams of alpha-linolenic acid per day. Alpha-linolenic acid is present in rapeseed, linseed, camelina, soya, hemp seed, wheat germ and walnut oils.



**Picture 5.** Examples of servings containing five to six grams of fat. The spoons have serving sizes for oil, 60% margarine, salad dressing and a liquid vegetable oil product.

## Sugary foods

**Definition:** Sugary foods include sweets, chocolate and other foods high in free sugar, such as sweet pastries and biscuits.

**Nutrient content and consumption:** Sweets, chocolate and other sugar-rich foods are high in energy and saturated fat and low in essential nutrients and fibre. Finnish adults consume an average of 47 grams of sweets, chocolate, sweet pastries and biscuits per day. Sugar-sweetened beverages, sweets, sweet pastries, snack products and, in children, sweetened milk products are key sources of free sugar.

**Health effects:** Sugary foods mainly provide only energy, and a high consumption usually increases an excessive energy intake. A diet rich in free sugar is associated with poorer diet quality and lower nutrient density. A frequent consumption of sweets and other sugary foods increases the risk of tooth decay. Sugar-sweetened drinks increase the risk of obesity and type 2 diabetes. Children, adolescents and individuals with relatively a low energy requirement are at risk of inadequate intake of essential nutrients if their diet is high in sweets and other sugary foods. In addition to sugar, pastries, biscuits and ice cream often contain high levels of saturated fat, which has unfavourable health effects.

**Environmental impact:** Although the climate impact of sugar is relatively small, a high consumption of sugar and sweets increases the environmental impact of diets without any nutritional benefits and thus causes unnecessary environmental burden. Chocolate and sweets contain fats and cocoa whose production adversely affects global biodiversity. Globally, the production of these foods competes for land that could be used to produce nutritionally higher-quality foods. However, consuming these products in small amounts does not significantly affect the environmental impact of the diet.



### RECOMMENDATION

- Foods rich in free sugar should be consumed as little as possible.

## Beverages

**Definition and consumption:** In these guidelines, beverages include coffee, tea, sugary beverages and low- and non-energy drinks. Finns consume about two litres of various drinks (excluding liquid dairy products) per day. The average daily coffee consumption is 4.9 decilitres among Finnish men and 3.8 decilitres among women. On average, women drink tea 1.5 decilitres and men 0.8 decilitres per day. The corresponding consumption figures for sugary soft drinks and juices are 0.6 decilitres for women and 1.2 decilitres for men.

**Health effects:** Beverages are a source of liquid for the body. The requirement for liquid varies between individuals. In most people, drinking in response to thirst is sufficient to meet hydration needs. The recommended daily intake of beverages is 1 to 1.5 litres in addition to the liquid in foods. A long-term moderate consumption of coffee and tea is beneficial to health, and no negative health effects have been observed. A regular consumption of unfiltered coffee can increase blood cholesterol levels. Caffeinated beverages include coffee, tea, and cola and energy drinks. Beverages containing free sugar are associated with obesity and tooth decay in children and adults, and with type 2 diabetes and cardiovascular diseases in adults. Frequent use of sugary and sugar-free acidic beverages causes tooth enamel to dissolve, which is why they should not be used regularly.

**Environmental impact:** Excessive consumption of coffee and sugary beverages increases the environmental impact of diets without significant nutritional benefits and thus causes unnecessary burden on the environment. Coffee is one of the food products with the greatest adverse impact on global biodiversity in the Finnish diet. From an environmental point of view, tap water is the recommended beverage of choice.

**Risk groups:** Children, adolescents and pregnant women are more vulnerable to high caffeine concentrations. Caffeine is found in coffee, tea and cocoa, for example. It affects the human central nervous system. A high consumption of caffeinated soft drinks and energy drinks can cause adverse health effects in children and adolescents due to caffeine and the high sugar content. (See [the Finnish Food Authority website for instructions concerning the safe use of foodstuffs](#)).



## RECOMMENDATION

- Tap water is the recommended beverage of choice.
- A moderate consumption of filtered coffee (about 1.25 to 5 decilitres per day) and tea can be part of a health-promoting diet.
- Limiting the use of unfiltered coffee\* and other drinks containing caffeine and added sugar, such as cola and energy drinks, is recommended.
- The total intake of caffeine from all sources should not exceed 400 milligrams per day.
- Pregnant and lactating women should limit caffeine intake to a maximum of 200 milligrams per day.
- For children and adolescents (one to 18 years), the safe intake of caffeine is limited to a maximum of three milligrams per kilograms of body weight per day.
- It is also good to keep the consumption of coffee low for environmental reasons.

\* Unfiltered coffee contains coffee bean oils (diterpenes), which may elevate plasma LDL cholesterol concentrations. Unfiltered coffees include coffee made in a pot or coffee press, Greek and Turkish coffees, and espresso-based coffees such as latte and cappuccino.

Some capsule coffees may contain diterpenes that increase blood cholesterol levels. Instant coffees are usually made from filtered coffee.



## Alcohol

**Definition:** Alcohol, or ethanol (100% alcohol), is found in beers, wines, spirits and drink mixtures.

**Nutrient content and consumption:** Alcohol has high energy content, 29 kilojoules (7 kilocalories) per gram. Excessive alcohol consumption can lead to excessive energy intake and poorer dietary quality. Alcohol (ethanol) is usually consumed in the form of beer (2.5 to 6.0 per cent alcohol by volume, ABV), wine (12 ABV) or spirits (40 ABV).

**Health effects:** Alcohol is a toxic substance that affects all organs of the body. Alcohol is effectively absorbed mainly from the small intestine and distributed throughout the body's water volume. According to new research evidence, both occasional and repeated alcohol use are associated with morbidity and mortality. Alcohol use has been linked to cancers, especially breast cancer and gastrointestinal cancers. A prolonged excessive alcohol consumption can lead to cirrhosis and is associated with increased mortality and poorer quality of life. Alcohol also affects oral health in many ways. The main oral effects of alcohol are dry mouth, tooth erosion, mucous membrane changes and oral cancer. Alcoholic beverages containing sugar can cause or increase tooth decay.

Excessive alcohol consumption can have detrimental effects on adequate nutrient intake and absorption. Children, adolescents, pregnant women and older people are particularly susceptible to the adverse effects of alcohol. Alcohol use and binge drinking may also be associated with other harms, such as violence and traffic accidents.

**Environmental impact:** The consumption of alcoholic beverages increases the environmental impact of diets without any nutritional benefits and thus causes unnecessary environmental burden. However, consuming a moderate amount of alcohol does not significantly affect the environmental impact of the diet.

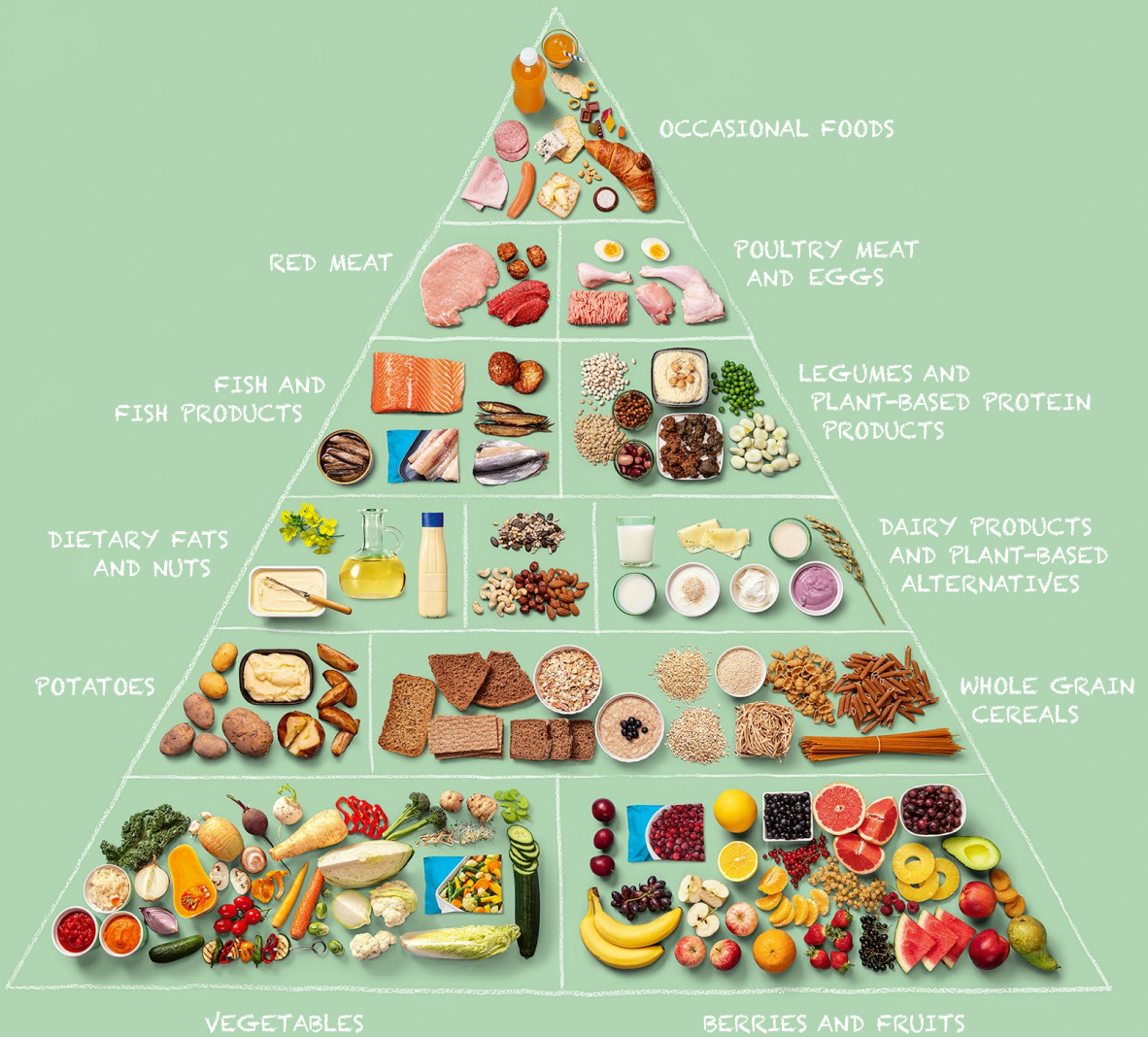
### RECOMMENDATION

- As it has not been possible to set a safe limit for the consumption of alcohol, it is not recommended. However, if alcohol is used, the amount should be as small as possible.
- Alcohol consumption is not recommended at all for children, adolescents, pregnant and lactating women, and older people.

## Diet composition

- ▶ A health-promoting diet combines variety, balance, enjoyment and moderation.
- ▶ Such a diet is rich in vegetables, berries, fruits, whole grain products, fish and unsaturated fat, moderate in fat-free and low-fat dairy products, nuts, seeds and legumes.
- ▶ The diet includes as little processed meat, sugar-sweetened beverages, foods high in sugar and salt, and low-fiber grain products as possible.

Health-promoting diets have high nutritional density, contain a moderate amount of unsaturated fat and a lot of fibre, and are low in saturated fat, free sugar, salt and alcohol (Picture 6, Table 3). When the diet has a balanced energy content and adequate nutrient content, the meal pattern may vary. Sugar and sugary products should be consumed primarily with meals because each sugary drink or snack causes an acid attack in the mouth. The use of xylitol products interrupts acid attacks, and a regular use of xylitol (daily dose of at least 5 grams) reduces the risk of tooth decay.



**Picture 6.** The food pyramid shows the foods at different levels according to the recommended intake and frequency of use. The foods at the bottom should be eaten in larger amounts and daily, and those at the top in smaller amounts and infrequently.

**Table 3. Recommended dietary changes to promote health.**

Increase	Replace	Reduce
Vegetables	Low-fibre cereals → whole grain products	Processed meat
Berries and fruits	Butter and spreads containing butter → vegetable oils, vegetable oil based spreads	Red meat
Legumes	Fatty milk products → low-fat and fat-free milk products	Foods high in added fat, salt and sugar
Potatoes	Foods high in added fat, salt and sugar → foods and food products low in added fat, salt and sugar	Salt
Whole grain cereals		Alcohol
Nuts		
Fish		

Plant-based diets that contain individual or multiple sources of animal protein are not classified as special diets. When implemented in a varied and balanced manner, they are nutritionally adequate and health-promoting diets for all age groups (Pictures 7 ja 8). Traditionally, plant-based diets have been classified according to the animal protein sources they contain, such as the pescovegetarian (including fish), the lacto-ovovegetarian (including dairy products and eggs) and lactovegetarian (including dairy products) diets.



**Picture 7.** The plate model includes a broad bean and vegetable stew as the main dish. A well-balanced meal also includes a vegetable side dish, a berry or fruit dessert, a slice of whole grain bread with vegetable fat spread, and a glass of fat-free milk, buttermilk or fortified vegetable drink.



**Picture 8.** The plate model includes a bean caponata as the main dish. A well-balanced meal also includes a vegetable side dish, a berry or fruit dessert, a slice of whole grain bread with vegetable fat spread, and a glass of fat-free milk, buttermilk or fortified vegetable drink.

Animal products such as eggs, meat, fish and dairy products contain nutritionally high-quality protein with an amino acid composition that meets human needs. Diets can be composed in many different ways, which is considered individually in nutrition counselling to ensure adequate intake of all the essential nutrients. The intake ranges included in the food-based dietary guidelines make it possible to set individual goals. For example, in a diet low in vegetables, berries and fruits, 500 grams per day is a good and sufficient goal.

## Illustration of a health-promoting diet and meal

The food pyramid (Picture 6) and plate models (Pictures 7–11) have been developed to facilitate planning of a health-promoting diet. Both tools provide guidance on how to put together a health-promoting diet. The plate models help visualize the composition of a balanced meal. In table 4 recommended food choices are shown.



**Picture 9.** The plate model includes fried perch with boiled potatoes and vegetables as the main dish. A well-balanced meal also includes a serving of vegetable oil based dressing, a berry or fruit dessert, a slice of whole grain bread with vegetable fat spread, and a glass of fat-free milk, buttermilk or fortified vegetable drink.



**Picture 10.** The plate model includes fish steaks with mashed potatoes and vegetables as the main dish. A well-balanced meal also includes a serving of vegetable oil based dressing, a berry or fruit dessert, a slice of whole grain bread with vegetable fat spread, and a glass of fat-free milk, buttermilk or fortified vegetable drink.



**Picture 11.** The plate model for packed lunches features a salad as the main dish, containing a variety of vegetables, egg, nuts, and hummus. The meal also includes whole grain bread with hummus, a glass of fat-free milk or buttermilk or a fortified plant drink.

**Table 4. Recommended food choices.**

Food group	Recommended intake	Things to note <sup>4</sup>
Vegetables, berries, fruits	At least 500–800 g per day	Variety; avoid products containing free sugar and salt. Of the recommended intake, half should be vegetables and root vegetables, half berries and fruits.
Legumes	<sup>1</sup> Indicative recommendation: 50–100 g (cooked) <sup>2</sup>	Good nutrient content, a recommended choice in terms of the environment, especially to replace meat. Use dried, minced, frozen, canned and as preparations.
Cereals and cereal products	At least 90 g of whole grains per day (dry weight) <sup>3</sup>	Preferring salt-free and low-salt products. Low use of products containing added fat and sugar.
Potatoes	<sup>1</sup>	A recommended choice in terms of the climate. Avoid high-fat and salty products.
Fats and oils	A minimum of 25 g of non-tropical vegetable oils per day	Avoid butter and tropical vegetable oils.
Nuts, seeds	20–30 g per day	Recommendation given for nuts. Research evidence is insufficient to recommend intake of seeds, but consumption is recommended. Avoid products containing sugar and salt.
Milk and dairy products	350–500 g per day	Prefer fat-free and low-fat products that meet the Heart Symbol criteria. The recommended intake depends on the intake of calcium, iodine and vitamin B <sub>12</sub> from other sources. Avoid products that are high in sugar and salt. Extensive consumption is not recommended in terms of the environment. Can be partially replaced with plant-based products fortified with calcium, vitamin D, iodine and vitamin B <sub>12</sub> . <sup>5</sup>
Fish and fish products	300–450 g per week (cooked, edible part), of which at least 200 g should be fatty fish	Favour sustainable fish stocks.
Poultry meat	<sup>1</sup>	A lower consumption than at present is recommended in terms of the environment.

Food group	Recommended intake	Things to note <sup>4</sup>
Red meat	Maximum 350 g of cooked meat and processed meat per week (approximately 500 g raw meat)	A lower consumption is recommended in terms of the environment.
Prosessoitu liha	As little as possible	Applies to both red meat and poultry products. Based on health evidence, consumption should be minimised due to high saturated fat, salt, nitrite and phosphate.
Eggs	<sup>1</sup>	Up to one egg per day.
Sweets, sugar-sweetened beverages	As little as possible	
Alcohol	As little as possible	No safe consumption level. Not recommended at all for children, adolescents, pregnant women, lactating nursing mothers, and older people.

- 1 Insufficient research evidence is available to determine the recommended intake.
- 2 For example, one decilitre of frozen peas weighs 60 grams, one decilitre of boiled white beans 70 grams, and one decilitre of cooked lentils 80 grams.
- 3 For example, three slices of rye bread, a plate of oatmeal porridge or a generous decilitre of boiled barley groats contain a total of 90 grams of whole grains.
- 4 Favoring products that meet the Heart Symbol criteria. The Heart Symbol indicates that the product is a better choice in terms of nutritional value within its product group. Not all products that meet the criteria have the Heart Symbol.
- 5 Only soy products have a protein content and protein quality comparable to cow's milk.

## Vegan diet

A vegan diet does not include products of animal origin. Vegan diets should contain plenty of good sources of vegetable protein (soy in various forms, beans, peas, lentils, whole grains, nuts and seeds). The amino acid composition of soy protein nearly corresponds to that of animal protein. The amino acid composition of different protein sources complement each other in the best possible way when the diet combines legumes and whole grains.

In a vegan diet, special attention must be paid to nutrients that are scarce in plant-based foods. Vegan diets contain less riboflavin, vitamins A and D, calcium and iodine than mixed diets. Vegan diet does not contain vitamin B<sub>12</sub> in a form that the body can utilize. Long-chain fatty acids (eicosapentaenoic acid and docosahexaenoic acid) are practically absent from vegan diet. Their adequate level in the body can be ensured by consuming vegetable oils and vegetable fat spreads containing alpha-linolenic acid (see 'Fats'), as the body converts these long-chain fatty acids from alpha-linolenic acid. Some nutrients may be absorbed less readily from plant-based foods than from food of animal origin. In particular, the phytate in grains and legumes can interfere with the absorption of iron and zinc.

Whole grains are an important source of energy, protein, minerals, vitamins and fibre in vegan diet, and fibre also increases the feeling of satiety when eating. Daily use canola oil and spreads made of these oils and containing at least 60% fat is recommended to ensure adequate linoleic and alpha-linolenic acids. Nuts and seeds also provide essential linoleic acid, whereas walnuts also provide alpha-linolenic acid.

By compiling a varied vegan diet and using fortified foods and dietary supplements, it can be ensured that the diet's nutrient content meets the average nutritional requirements. In particular, the intake of vitamin B<sub>12</sub>, vitamins A and D, calcium and iodine should be ensured by using fortified foods and dietary supplements (see '*Fortification of food products and dietary supplements*'). Fortified plant-based drinks are an important source of vitamin D, riboflavin and calcium. Plant-based drinks may also be fortified with iodine. The main sources of vitamin A include vegetables rich in beta-carotene such as carrots, sweet potatoes, kale, broccoli and spinach, as well as fat spreads fortified with vitamin A.

So far, no long-term follow-up studies on the effects of a vegan diet on children's nutritional status, growth and health are available. Vegan diet high in acidic products may be associated with tooth wear and enamel dissolution.

# Fortification of food products and dietary supplements

- ▶ **Fortification can be used to improve the nutrient content of foods used to replace other foods or to restore the vitamin or mineral levels reduced during processing, storage and handling.**
- ▶ **Recommendations for the use of dietary supplements have been issued for population groups at risk of insufficient intakes.**
- ▶ **The use of dietary supplements has not been found to reduce the risk of non-communicable diseases.**

Fortification of foods means the addition of vitamins, minerals and other substances with a nutritional or physiological effect to foods. Fortification is mainly voluntary and regulated by the EU food fortification Regulation (EC) No 1925/2006. In Finland, fortification is only obligatory in the vitamin D fortification of fat-free homogenised milk, including organic milk. The legislation defines the conditions for fortification, such as the amount of vitamin or mineral to be added and the chemical form. Food products and the nutrient concentrations derived from them must be safe.

Fortification can improve the nutrient content of food products so that it better corresponds to that of the foods they are intended to replace. For example, fortified plant-based drinks can replace milk and buttermilk. Fortification can also restore the vitamin or mineral content reduced during food processing, storage or handling. Some foods are fortified entirely on a commercial basis, and no nutritional benefit has been demonstrated from the use of such products.

Any nutrients added to food products are included in the list of ingredients. The total amount of the vitamin or mineral present in the food is indicated in the product's nutritional labelling. In addition, information about fortification may be provided by using approved nutritional and health claims.

Dietary supplements are food products sold in dosage forms, including pills or capsules, which are intended to supplement the diet with nutrients or other compounds that have a nutritional or physiological effect. If fortified food products or dietary supplements are placed on the market, a notification must be submitted to the Finnish Food Authority.

In people whose diets are varied and meet the energy requirement, the intake of nutrients from dietary supplements has generally not been shown to be beneficial in

the prevention of non-communicable diseases, nor have they been found to have any other beneficial health effects. Conversely, higher than recommended intakes of certain nutrients, in particular vitamins and antioxidants (e.g. vitamins C and E,  $\beta$ -carotene), from dietary supplements may have adverse health effects, including premature mortality. Dietary supplements are not intended to replace a varied diet, and research suggest that supplementing a diet that deviates from the recommended diet with dietary supplements is not beneficial.

Recommendations for the use of dietary supplements have been issued for some age groups and life situations. Vitamin D supplementation is recommended for the following groups:

- children from 2 weeks to 18 years
- pregnant and lactating women
- people 75 years and older.

Folic acid supplementation is recommended from the stage of planning of pregnancy until the end of the 12th week of pregnancy. The use of dietary supplements is justified in connection with restricted diets and the use of some medicines. A very low energy intake, such as an adult's intake below 6.5 MJ per day, is a basis for assessing the individual's need for dietary supplements. In the case of certain diseases, the use of dietary supplements is also recommended. Table 5 lists the nutrients whose intake from dietary supplements is recommended in certain population groups and situations.

**Table 5. Recommended use of dietary supplements.**

Dietary supplement	Recommended for	Often necessary
Vitamin D	<p>Infants from 2 weeks of age: 2–10 µg per day depending on the amount of infant formula or follow-on formula used.</p> <p>One-year-olds: 10 µg per day; 2–17-year-olds: 7.5 µg per day; all year round. Pregnant and lactating women: 10 µg per day all year round.</p> <p>≥ 75-year-olds: 10–20 µg per day all year round.</p>	<p>If dairy products or fat spreads fortified with vitamin D are not used daily, and/or fish 2–3 times a week, a 10 µg vitamin D supplement is recommended for 18–74-year-olds in October–March.</p> <p>People on a vegan diet</p> <p>People spending very little time outdoors, those wearing skin-covering clothing, people with dark skin.</p> <p>Cortisone therapy</p>
Calcium		<p>People on a vegan diet*</p> <p>Cortisone therapy</p> <p>Bariatric surgery patients</p>
Iodine		<p>People on a vegan diet*</p> <p>People using very little or no dairy products, fortified plant-based drinks and fish.</p>
Iron	<p>People with iron deficiency anaemia.</p>	<p>Pregnant women, women in childbearing age with heavy menstruation, those donating blood.</p>
Folate	<p>Women who plan to get or are pregnant: 400 µg per day from the planning stage to the end of the 12th week of pregnancy.</p>	<p>Women in childbearing age.</p>
Vitamin B <sub>12</sub>	<p>Individuals with the stomach or the end of the small intestine removed.</p>	<p>Older people</p> <p>People consuming little foods of animal origin</p> <p>People on a vegan diet</p> <p>Metformin medication</p>
Multivitamin-mineral supplement	<p>People with very low energy intake, bariatric surgery, breastfeeding multiple children, with a new pregnancy while breastfeeding, donating breast milk, restricted diet.</p>	

\* If the diet does not include foods fortified with calcium.

## Food safety

- ▶ **The best way to avoid potentially harmful substances in food is a diverse and varied diet moderate in energy.**
- ▶ **Risks can be avoided by handling and storing food properly, and complying with the labelling of the food product.**

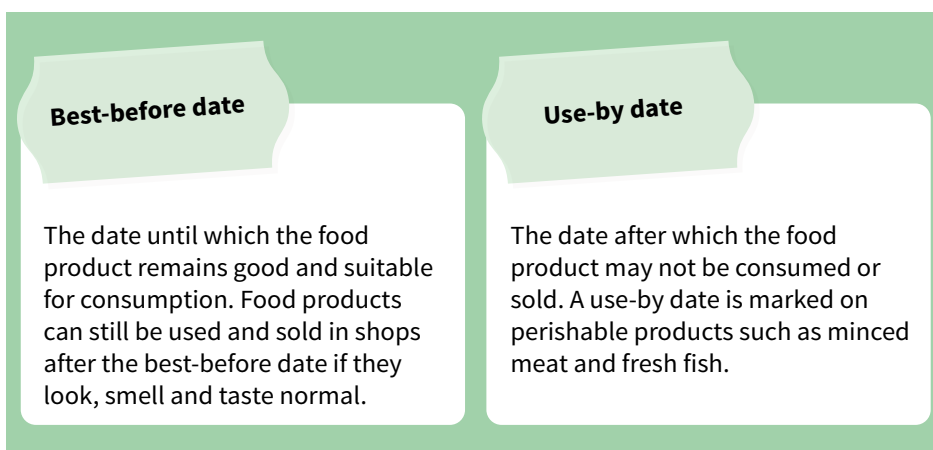
A diverse, varied and moderate consumption of foods ensures adequate intake of essential nutrients and supports food safety. A diverse diet means that it includes foods from several food groups. A varied diet means that different foods from different food groups, such as vegetables, berries and fruits, are used in a varied way. Moderate portion sizes also increase safety. Food portions should be adjusted to meet the energy requirement.

Food produced in Finland is safe in many respects. For example, antibiotics are not used preventively in Finland, or to boost the growth of animals. Antibiotics are not used at all in the production of chicken. Salmonella is less common in domestic foods than those produced in many other European countries.

Although the food available in Finland is generally safe, food products may involve risk factors that may cause adverse health effects. These include bacteria, moulds and viruses, other micro-organisms, plant protection product residues, chemicals migrated from materials that come into contact with food, and environmental contaminants such as heavy metals. Some foods naturally contain nitrate or natural toxins from vegetables. Harmful substances such as PAHs (polycyclic aromatic hydrocarbons) and acrylamide can be generated in food preparation. It is therefore advisable to avoid heavy browning and smoking, for example. Cooking, simmering, and oven and microwave cooking are the most recommended cooking methods in food preparation to avoid the formation of harmful substances. Chemical substances can be migrated to food from containers in contact with food or from food handling equipment. Contact materials should be used as advised, and disposable packaging (e.g. ice cream packaging) should not be used for food storage.

The microbiological safety of food is mainly based on the hygienic handling of food, the cold chain and appropriate cooking and storage temperatures. Good kitchen and hand hygiene and the proper handling of food are important. A product with an abnormal taste or appearance, for example, should not be eaten. Food can

contain pathogenic microbes even if it looks, smells or tastes fine. To reduce the risk of food poisoning, the instructions for storage and use on the labelling should be followed. The labelling may also provide information about who should not use the product, and whether a maximum amount has been set for consumption.



Recommendations for the safe use of food are based on both research data and a principle of precaution. The precautionary principle applies if there is reason to suspect that the product has adverse effects, even if the risk cannot be determined with certainty using current methods and knowledge. The recommendations for use consider both the health benefits and the potential risks associated with the use of the food product. The assessment is made based on the use of the food product, the target user group, the presence of a potential hazard and its harmfulness. Recommendations for use may change as more research evidence is gathered. More specific recommendations have been issued for particularly sensitive population groups such as pregnant and lactating women, infants, children and older people compared to those for the general population. [The Finnish Food Authority website](#) includes instructions concerning the safe use of foodstuffs, which are updated with the latest information. Products intended for infants and young children are subject to stricter legislation than other foods, which provides for stricter levels of harmful substances, requirements for ingredients and permitted ingredients compared to other foods. For guidance on special diets, please refer to the [Guidelines for nutritional care](#).

In the food sector, food producers, manufacturers and sellers are primarily responsible for food safety. Compliance with the requirements of food legislation is monitored in municipalities through random checks and targeted control projects. Local food control authorities, Customs and the Finnish Food Authority carry out food control within their respective areas of jurisdiction. Food safety is also closely monitored internationally.

Knowledge and  
nutrition health  
for all.



## IMPLEMENTATION AND APPLICATION

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# Food education, nutrition counselling and nutrition communication

- ▶ **Food education, nutrition guidance and nutrition communication are important tools in developing food habits that support health and sustainability, as well as a diverse food culture in society.**

Education, teaching, counselling, and guidance based on the nutrition recommendations cover aspects related to food such as production and preparation, meals, nutrition and consumership. They increase individuals' and communities' ability to make health-promoting and sustainable food choices and help support their ability to understand and critically evaluate the nutrition information produced by different parties.

Cooperation between early childhood education, different levels of education, food services, organisations, the private sector, social and health services, and public administration is a key factor in promoting nutritional health and sustainable food culture. A positive approach to food education, nutrition counselling and nutrition communication, as well as a positive and constructive manner of talking about food are important means of achieving the well-being, health and sustainability goals of municipalities and wellbeing services counties.

Multidisciplinary collaboration, education, counselling and nudges to promote healthy choices are essential ways to build food environments that enhance well-being and support related choices. In addition, such actions help to identify products that are better for the environment and nutrition, and they deepen the understanding of which methods are effective in different food environments and target groups.

## Food education

Food education is part of the activities of municipalities, wellbeing services counties and the third sector, which apply to different age groups. Food education may include teaching, verbal or visual interaction, visits, collaboration and guidance. The aim is to increase food competence, the joy and appreciation of food, as well as to support the development of eating habits that promote well-being and health. Another aim is to enhance people's food sense, that is, their situational understanding of food-related phenomena, ability to solve problems that arise in everyday situations and understanding of the food system.

In food education, it is important to take daily routines into account and support an appropriate meal pattern and balanced relationship with food. With children and young people, food education is part of early childhood education plans and school curricula, and all staff and guardians participate in it. Food education is also implemented in homes and leisure activities, and it may be part of various disability and housing services.

## **Nutrition guidance**

All healthcare professionals are responsible for nutrition guidance and advice. Licensed nutritionists provide nutritional therapy that requires in-depth expertise. Nutrition experts from public health organisations and other professional groups are also important implementers of nutrition guidance and advice. In addition to nutrition knowledge, nutrition guidance requires an understanding of how a positive and interactive approach supports the adoption of health-promoting food habits and a balanced food and body relationship.

## **Nutrition communication**

Nutrition communication is carried out by nutrition and healthcare experts, food services, non-governmental organisations, food companies and the media. It covers a wide range of communication forms, such as information, campaigns, advertising, online content, public events and media communications. The aim of nutrition communication is to increase people's understanding of health-promoting and sustainable food choices and to support people in making them.

Product labelling is one form of nutrition communication. Public debates spread health claims that are not based on research data and may even be harmful to health. Children and young people in particular are susceptible to such communication, and it is therefore important to improve their media literacy and source criticism. In education and training, it is important to develop the ability to distinguish claims based on scientific evidence from opinions or advertising, as well as to understand how different parties influence food communication. Nutrition communication should promote positive talk about food and encourage healthy and environmentally sustainable eating habits.

**Effective food education, nutrition guidance and nutrition communication**

- Food education and nutrition knowledge should play a more prominent role in the basic and continuing education of professionals and teachers in nutrition, social and health services, food services and early childhood education. The availability of skilled labour, especially in food services, should also be ensured in the future.
- Education and training should strengthen people’s understanding of food, its production and preparation, nutrition recommendations and factors affecting food choices.
- Nutritional health, management of daily life and sustainable lifestyle of children and young people should be supported as a continuum that begins in early childhood education and is given attention in the meals in schools and educational institutions, and especially in home economics, environmental studies and health education.
- Food and media education should support children’s and young people’s ability to critically evaluate nutrition messages in different media environments.
- Food education and nutrition guidance should be included in national and regional health and well-being strategies to promote a sustainable food culture and nutrition health in all age groups.
- Municipalities and wellbeing services counties should promote food education and nutrition health by drawing up local food education plans, providing adequate nutrition therapy services, and ensuring a clear division of responsibilities and sufficient resources to support multiprofessional cooperation.
- Experts in food education, nutrition and the environmental impact of food consumption should be actively involved in societal decision making so that decisions are based on up-to-date research data.
- Promoting health-supporting food environments and choices through multi-sector collaboration, education, guidance, and nudging interventions that encourage healthy choices.

# Application of the nutrition recommendations in food services

- ▶ **Food services play a key role in implementing nutrition recommendations as they prepare and provide health-promoting and sustainably produced meals that comply with the dietary guidelines.**
- ▶ **Food services disseminate nutrition information and promote healthy eating habits.**

In food services, it is important to examine and update food purchases, recipes and menus in line with the new recommendations. Changes and their rationale can be communicated to customers on menus, information boards and customer letters.

The nutrition recommendations serve as the basis for menu design and meal planning according to the food service objectives and customers' needs. They are also important criteria guiding the sourcing of food products and ingredients. Ingredient choices that promote health and the well-being of the environment are described by food group in the chapter 'Recommended food choices'.

A single meal meets the recommendations when it is balanced and contains a main course with high-quality vegetable protein, fish, poultry meat, eggs or red meat; potatoes or a fibre-rich side dish to provide energy, a vegetable side dish, vegetable oil or oil-based salad dressing, a beverage, a slice of high-fibre and low-salt bread and vegetable fat spread. The main course can be a warm meal, or it may be a filling, varied salad with side dishes when it meets the requirements of the target group. The key is that diners have the opportunity to choose a health-promoting and well-balanced meal. Diners' choices can be guided by an attractive presentation, the order of the meal components, menu entries and service counter labelling.

## Menu planning

The recommendations concern not only the choices of ingredients offered but also their nutrient content. The minimum requirements for the nutritional quality of main courses, energy-rich side dishes and other parts of meals served in food services are described in Appendices 14a to c.

## Things to consider in menu planning:

Increase	Reduce
<ul style="list-style-type: none"><li>• The use of legumes, whole grains, vegetables, root vegetables, seeds and nuts</li><li>• The use of ecologically sustainable fish options</li></ul>	<ul style="list-style-type: none"><li>• The use of red meat and meat products. The use of poultry meat should not be increased.</li><li>• Foods high in saturated fat, salt and sugar</li></ul>

The minimum requirements for nutritional quality are used in the planning of food instructions and the procurement and preparation of food. The recommended energy and nutrient content per meal must be met at a weekly level on average. In the calculation of contents, it is possible to use production management systems tailored for meal planning. Recipe collections are also available for food preparation, which include the energy and nutrient contents for meals. Food service providers must be able to show their customers that their food meets the recommendations. Lunches should be planned so that the main meal meets around a third of the customer's daily energy requirement.

Minimum quality requirements have been set for the amount and quality of fat and the amount of salt and fibre. By following the minimum requirements for nutritional quality, it is possible to meet the recommended relative proportions of energy-yielding nutrients per meal, which are described in the chapter '*Recommended intakes of energy and nutrients*'. The amount of fat in main meals may be higher than the amount recommended for the diet as a whole if the quality of the fat meets the recommendations (less than 10 E% of saturated fat). The amount of free sugar (up to 10 E%) must also be taken into account in ingredient choices and meal planning.

In menu planning, it should be considered that the use of red meat, processed meat and poultry meat should be reduced compared to the previous recommendation. The recommended amount of cooked red meat and meat products, which is a maximum of 350 grams per week, includes food consumed both outside of and at home. Correspondingly, the amount of legumes, whole grain cereals, vegetables, root vegetables, seeds, nuts and environmentally sustainable fish options must be increased in the meals served (see '*Nutrition health effects*'). Adults should consume 300 to 450 grams of fish per week, of which the proportion of fatty fish should be about 200 grams.

Potatoes are a familiar and traditional ingredient in Finnish cooking, and increasing their use in diets is recommended. As they are an environmentally friendly and nutritionally good choice (when prepared without added fat and salt) to provide energy. In addition to potatoes, various fibre-rich cereal products are nutritionally recommended side dishes. If possible, using whole grain barley, wheat or oats instead of rice is recommended.

## Food serving

Food choices that meet the recommendations and portion sizes that follow the plate model can be promoted through the layout and labelling (e.g. the Heart Symbol) used in serving counters. In serving counters, the recommended options should be placed in such a way that it is easy to select them. An image of a model portion or equivalent should be placed in a visible place in the restaurant. Serving counters should be arranged so that vegetables and salads are served at the beginning of the counter, followed by warm main dishes with vegetarian food first, and then by beverages and breads, unless there is a separate table for serving breads. By offering a varied selection and serving different components of the salad separately, including berries and fruits, the use of vegetables can be increased. In providing meeting catering and snacks, the availability of plant-based options that promote health and comply with recommendations should also be ensured. People can also be encouraged to select vegetarian food by offering it at a cheaper price at lunch.

## Food service and food product procurement

Food services are either produced by operators themselves or purchased as a service. Sustainable public food services support security of supply and self-sufficiency (see the chapter *'Food security and nutrition health for all'*). Procurement legislation sets requirements for competitive tendering, but the Public Procurement Act does not define the quality requirements for food service procurements. In terms of nutritional quality, the nutrition and food-based dietary guidelines of the National Nutrition Council are used in competitive tendering. Food service professionals and tenderers have the joint task of defining quality criteria, the most important of which is the nutritional quality of food and food products. Nutritional quality requirements are set for products by using meal component-specific requirements (Appendices 13a to c) or the approval standards for the Heart Symbol products. The provision of plant-based food and the responsible procurement of ingredients should be added as criteria for competitive tendering in public food services.

With the help of competitive tendering, food service providers can be required to provide information about the environmental impacts of their purchases and identify operators who are able to provide responsibly produced food. The requirements of a health-promoting diet and factors related to responsibility (including environmental, social, economic and ethical values) presented in the nutrition recommendations must be used as procurement criteria for public food services and food products. It is important to record compliance with the nutrition recommendations in food production to food service agreements. Service agreements and descriptions should include criteria for the nutritional quality and responsibility of meals, as well as related evaluation and monitoring criteria and the agreed reporting activities. A collection of responsibility requirements to support procurements can be found in the Criteria Bank ([www.kriteeripankki.fi/en](http://www.kriteeripankki.fi/en)).

Security of supply must be taken into account in all operations. Food service operators must draw up a continuity management plan with their customers. The plan must include steps to ensure operations in various exceptional situations such as large-scale disruptions of electricity and/or water supply or telecommunications, and various epidemic or pandemic situations. Even in exceptional situations, a varied and balanced food supply should be considered and applied where possible.

## **Responsibility**

Responsible food service providers take the nutrition recommendations into account, which support good nutritional quality, the provision of high-quality food, food safety, food education, and environmentally friendly and ethical food production and consumption. Responsible food services also pay attention to the objectives of the national procurement strategy concerning ecological, economic and social sustainability. Overall responsibility assessment includes ingredient production methods, food preparation methods, food procurement criteria, food serving methods, serving and packaging material choices, food transport, food waste reduction and use of surplus food, among others.

The responsibility of a food service provider includes, for example, assessing the climate impact of meals and possibly reducing them through menu planning and ingredient choices. Providing information about the climate impact of meals in menus allows consumers to choose climate-friendly meals. By considering both the climate impact and the nutritional quality of meals, service providers can develop as climate-friendly meals as possible and offer diners information about the climate impacts of different food options and meal components. The Motiva guide for responsible food procurement offers guidance on responsible procurement.



## RECOMMENDED MEASURES

### Implementation of health-promoting, sustainable and responsible food services

- In food services, the nutrition recommendations should be used as a basis for food procurement, menu planning and meal compilation.
- Food service professionals should develop tasty, varied, health-promoting and sustainable recipes for the needs of mass catering.
- The aim is to increase the use of plant-based food by offering attractive and health-promoting alternatives.
- Customers should be informed about changes in food serving and their rationale on menus, on information boards, in daily customer service situations and in customer letters.
- Customers are guided to make recommended food choices and follow the plate model for portioning, for example, through the serving line layout and plate size.
- Food services and procurement units should pay attention to the objectives of the [national procurement strategy](#) concerning ecological, economic and social sustainability.
- For example, the [climate data](#) set produced by the Natural Resources Institute Finland (Luke) should be used.



# Food security and nutrition health for all

- ▶ **Health-promoting and sustainable diets support all dimensions of human health and well-being.**
- ▶ **They are affordable, safe, fair, culturally acceptable and have the lowest possible impact on the environment.**

Enabling diets that promote health and cover various dimensions of sustainability for all population groups requires nutrition policy measures and societal policy instruments, as well as the involvement and social responsibility of all food industry actors. Social sustainability is based on the concept of human dignity, which emphasises the equality of human beings (e.g. the UN Charter, the Constitution of Finland). The different dimensions of sustainability are interdependent: a sustainable economic development cannot be achieved without supporting social sustainability; economic production has ecological limits; and curbing overconsumption requires a fair green transition.

Health inequalities between population groups are steeper in Finland than in many other Western countries. Key nutritional challenges and other health behaviours detrimental to health mostly affect the lowest socio-economic groups. In particular, the physical and social food environment guides the food choices of those in lower socio-economic positions, as well as children and young people. Public food catering and the possibility of having lunch during working hours involve the food security perspective as well as the dimension of social policy: they reduce nutritional disparities between population groups and promote equality in health.

## The need for food aid has increased

According to the definition used by the UN organisations, food security means a state in which all people have physical, social and economic access to sufficient, safe, nutritious and culturally appropriate food. Nutritional security, which is a dimension of food security, includes the right to nutritionally adequate and safe food appropriate for each population group.

The share of food in household consumption expenditure is one of the indicators of food security. As household income increases, the share of food in total consumption decreases: in 2022, the share of food and non-alcoholic beverages in consumption

expenditure was 18% for those with the lowest income and 12% for those with the highest income. Severe food insecurity occurs in Finland, especially in households that have great difficulties in covering regular expenses. In Finland, food aid has mainly been a service provided by the third sector, becoming an established means of addressing gaps in the public sector's ability to ensure a basic standard of living.

## **Self-sufficiency creates a basis for security of supply**

According to an international ranking (Global Food Security Index 2022), Finland is the number one in the world in terms of food security. One of the factors used in the comparison is the country's self-sufficiency in food. Finland has a high self-sufficiency rate, around 80%, which means that most of the ingredients used by the Finnish food industry are of domestic origin. This contributes to a better security of supply. The core of security of supply lies in functioning markets and the continuity of the entire food supply sector, which contingency planning and other security of supply efforts aim to maintain as close to normal conditions as possible, even in disruptions and exceptional circumstances.

Networked modern society and dependence on foreign inputs such as energy, fertilisers, feed raw materials, plant protection products and partly seeds and seedlings may weaken self-sufficiency and crisis resilience. In addition, poultry production requires imported eggs and chicks for parent stock renewal. In terms of fruits, berries, vegetables, seeds and nuts, Finland is partly dependent on imports, and a rapid rise in self-sufficiency is not foreseeable.

Local food production contributes to maintaining self-sufficiency and local security of supply, and local producers and food companies may therefore also play a role in disruptions. The advantage of organic production is its low dependence on foreign inputs, as well as the fact that production is based on crop rotation and an efficient recycling of nutrients.

Nutrition recommendations are part of food security when they promote the consumption of foods recommended for health. Seasonal eating, the use of domestic alternatives and focusing consumption on domestic production support primary production and security of supply. From the perspective of security of supply, it would be advantageous to increase the use of underused ingredients that thrive in Finland, as well as the use of domestic sustainable fish species that are currently underused. Food security and self-sufficiency can be strengthened by increasing the production of domestic plant proteins used directly for human consumption and by developing recipes that use them. An increase in demand for plant protein sources could increase their domestic production, but this would require the development of the selection of varieties and cultivation methods, a change in agricultural policy and the construction of value chains for products.

### Promoting of social sustainability and security of supply

- Ecological sustainability should be strengthened in all parts of the food system to ensure food security.
- Policymaking should support the production and use of domestic plant proteins for human consumption.
- Retailers should increase the supply, marketing and prominent placement of healthy and sustainable food products.
- In policymaking, evidence-based food consumption steering methods should be introduced to promote health equality and protect vulnerable groups (e.g. regulation of the marketing of unhealthy foods).
- Employers should provide all employees with the possibility to have a well-balanced meal during working hours.
- Food services should expand meal services to older people and those out of the labour force living at home.



# Monitoring and evaluation of population nutrition and environmental impacts

- ▶ In Finland, the aim is to move towards a nutritionally adequate food consumption that promotes the health of the population, with minimal adverse impacts on the climate and the environment.
- ▶ A controlled transition requires reliable monitoring data on both food consumption and the climate and environmental impacts of food.

## Finland has monitored nutrition for a long time

In Finland, the nutrition of the adult population has been regularly monitored in the national FinDiet Surveys since 1982. This representative population data form the basis of nutrition monitoring by providing evidence-based information concerning Finnish adults' food consumption, nutrient intakes, sources of intake, use of dietary supplements and changes over time. People's nutritional status is also evaluated using blood and urine samples. Nutrition monitoring provides information that is necessary to identify nutritional risk groups in the population. The information is also required to assess the risks posed by food contaminants and the environmental impact of diets. The data also enable scientific research and participation in global nutrition monitoring projects. Extending the regular nutrition monitoring carried out by the Finnish Institute for Health and Welfare to children, young people, pregnant and lactating women, and older people is an important national goal.

## Nutrition monitoring methods and challenges

Nutrition monitoring requires reliable food consumption research methods. To obtain nationally valid and internationally comparable information, it is important to update and develop dietary assessment methods, the national food composition database, and food consumption recording and calculation programs. This monitoring knowledge and expertise is a national strength that we should secure in the future as well. Based on the information obtained from nutrition monitoring data, Finland has succeeded in improving the public health nutrition through effective policy measures such as adding selenium to fertilisers, fortifying foods with vitamin D and using iodised salt.

For EU nutrition monitoring, 24-hour dietary recalls are recommended as the main method for youth and adults. On the other hand, food diaries are especially suitable for monitoring children's food consumption as it requires guardian's assistance. For example, the data collected with these methods can be used to statistically model what proportion of the population does not meet the reference values set in the nutrition recommendations. Biological samples, such as blood and urine, can be analysed for biomarkers that describe the nutritional status, including serum vitamin D and urine salt and iodine content. The results of nutrition monitoring can be complemented with food frequency questionnaires (FFQs) measuring long-term food consumption, questionnaire-based indicators and screening methods, and nutrition balance sheet and food purchase data. It is also important to use qualitative methods to gain information about the barriers to healthy and sustainable eating in different population groups, and into values and attitudes related to food, because this supports efforts to improve the nutrition of the population.

Reliable, comprehensive and up-to-date information on the population's nutrition requires regular research data from all population groups. The implementation of nationally representative nutrition monitoring requires human resources, validated methods and sustained funding, which has become increasingly challenging to secure. Digital nutrition research methods must be developed and used to an increasing extent while ensuring the quality of the data gathered. In the future, data on lifestyle and food behaviours collected in social and health services and municipalities may provide additional information for national nutrition monitoring.

## **Monitoring of food production, diets and the environmental impact of food products**

Through international agreements and national legislation, Finland is committed to reducing the greenhouse gas emissions produced by the Finnish economy to net zero. According to the Climate Act, Finland must be carbon neutral in 2035. These emissions are monitored through the national greenhouse gas inventory, which describes the emissions development of different sectors of the economy, as well as the development of land use related emissions and carbon sinks. Agriculture is monitored as a separate sector, but food production is part of the industrial sector. Finland is also internationally committed to the protection of the Baltic Sea and biodiversity. The state of waterbodies and biodiversity is monitored continuously. The protection of the Baltic Sea and biodiversity can be promoted through sustainable food production and consumption.

As part of the EU, Finland is also committed to reducing and monitoring food waste. It should be monitored especially in households and food catering. The data concerning the climate and environmental impacts of diets and foods are based on scientific research, which typically use life-cycle assessment. Life-cycle assessment combines the production and consumption chain of a product into one value chain,

evaluates the environmental impacts generated and compares them with the output volume of the value chain. The output volume of the value chain can be based on production kilograms or the nutritional quality of the product, for example. In the future, comparable data on the environmental impacts of different foods in different production environments and countries should be produced so that differences in conditions and measures could be included in environmental impact results and interpretations, including in the context of diets.

## **Tools to promote healthy and sustainable nutrition**

Municipalities and wellbeing services counties have been provided with guidelines on how to record the promotion of municipal residents' nutritional health and other nutrition issues in their welfare reports. Municipalities and social and health services also have checklists available to monitor the setting, decision making and implementation of goals that support good nutrition.

The TEAviisari survey tool for municipal decision makers provides monitoring information about municipalities' activities in promoting well-being and health, including nutritional health. The results provided by TEAviisari can be used in the management of nutrition health promotion, including in well-being planning and reporting. The national population surveys produce indicator-level monitoring data for wellbeing services counties and municipalities concerning the food habits of different population groups. The Healthy Finland Survey gathers information about the adult population, and the nationwide School Health Promotion study targets basic education and upper secondary school students. The results can be viewed in the Sotkanet service provided by the Finnish Institute for Health and Welfare.

The nutrition commitment is a Finnish model that helps and encourages food industry operators to improve the quality of the Finnish diet and promote responsible nutrition practices. It offers a good tool for companies, communities and municipalities, for example.

The Guidelines for nutritional care and the food-based dietary guidelines for older adults describe the tools available to healthcare professionals and the screening methods used in nutrition counselling. Some of them can also be used by individuals to support their self-care and assessment of food habits (e.g. Ravitsemusnavigaattori, 'Nutrition Navigator').

The Well-Being through Nutrition website (in Finnish): [Ravitsemuksella hyvinvointia - Finnish Food Authority](#)

A policy brief about promoting nutritional health (in Finnish): [https://www.ruokavirasto.fi/globalassets/teemat/terveytta-edistava-ruokavalio/ravitsemuksella-hyv.vointia/policy-brief--toimenpidekannanotto-2023\\_web.pdf](https://www.ruokavirasto.fi/globalassets/teemat/terveytta-edistava-ruokavalio/ravitsemuksella-hyv.vointia/policy-brief--toimenpidekannanotto-2023_web.pdf)

Good Nutrition is a Political Decision – a guide (in Finnish): [https://www.ruokavirasto.fi/globalassets/teemat/terveytta-edistava-ruokavalio/esitteet/hyva\\_ravitsemus\\_esite\\_web\\_28.6.2019.pdf](https://www.ruokavirasto.fi/globalassets/teemat/terveytta-edistava-ruokavalio/esitteet/hyva_ravitsemus_esite_web_28.6.2019.pdf)

A checklist for municipalities (in Finnish): [https://www.ruokavirasto.fi/globalassets/teemat/terveytta-edistava-ruokavalio/esitteet/tarkistuslista\\_kunta\\_web\\_paivitetty\\_27.10.2020\\_uusi\\_f.pdf](https://www.ruokavirasto.fi/globalassets/teemat/terveytta-edistava-ruokavalio/esitteet/tarkistuslista_kunta_web_paivitetty_27.10.2020_uusi_f.pdf)

A checklist for social and health services (in Finnish): [https://www.ruokavirasto.fi/globalassets/teemat/terveytta-edistava-ruokavalio/esitteet/tarkistuslista\\_sote\\_web\\_18.10.2023\\_paivitetty.pdf](https://www.ruokavirasto.fi/globalassets/teemat/terveytta-edistava-ruokavalio/esitteet/tarkistuslista_sote_web_18.10.2023_paivitetty.pdf)

TEAvisari: <https://teaviisari.fi/teaviisari/fi/index>

The Sotkanet service: [Frontpage – Sotkanet.fi, Statistical information on welfare and health](#)

Nutrition commitment: <https://www.ruokavirasto.fi/en/foodstuffs/healthy-diet/nutrition-commitment/>

Nutrition Navigator (in Finnish): [www.ravitsemusnavigaattori.fi](http://www.ravitsemusnavigaattori.fi)

Carbon footprint data set for food ingredients (includes more than 1,200 products) to support the food service sector's climate efforts: [etsin.fairdata.fi](https://etsin.fairdata.fi)

## RECOMMENDED MEASURES

### **Monitoring and evaluation of nutrition and environmental impacts**

- The collection of national high-quality and up-to-date monitoring data concerning the environmental impacts of nutrition and food consumption in all population groups should be secured.
- New evaluation and monitoring methods and related expertise should be developed and used.
- The effectiveness of implementing the nutrition recommendations in different sectors should be monitored nationally in relation to up-to-date information about food consumption and nutrient intakes.

Reference values  
and additional  
information.



## APPENDICES

## Appendix 1. Intake of energy-yielding nutrients in relation to nutrition recommendations in adults aged 18–74

Recommended intake or intake range of energy-yielding nutrients, as well as the average daily intake and the proportion of those achieving the recommended intake in Finnish women and men aged 18 to 74<sup>1</sup>.

Nutrient	Recommendation	Women		Men	
		Intake	Those reaching the recommended intake (%) <sup>2</sup>	Intake	Those reaching the recommended intake (%) <sup>2</sup>
Fat, E%	25–40	38	68	39	65
Saturated fatty acids, E%	< 10	14	6	15	3
Monounsaturated fatty acids, E%	10–20	14	96	15	98
Polyunsaturated fatty acids, E%	5–10	6,9	89	6,8	95
Carbohydrates, E%	45–60	43	31	41	27
Dietary fiber, g/MJ	3	2.9	32	2.5	32
Free sugar, E% <sup>3</sup>	< 10	8.9	68	7.8	78
Protein, E%	10–20	18	85	18	77

1 The results presented in the table are based on the 2017 FinDiet Survey.

<https://urn.fi/URN:ISBN:978-952-343-238-3>

2 The estimated proportions of those reaching the recommended intakes are based on the distribution of intake in the modelled normal intake.

3 Sucrose intake has been used as an approximation of free sugar intake.

## Appendix 2. Intake of certain nutrients in relation to nutrition recommendations in adults aged 18–74

Average daily intake of certain nutrients from food, the average requirement (AR) and the proportion of those falling short AR in Finnish women and men aged 18 to 74<sup>1</sup>.

Nutrient	Women			Men		
	Intake	AR	Those falling short of AR (%) <sup>2</sup>	Intake	AR	Those falling short of AR (%) <sup>2</sup>
Vitamin D, µg	10	7.5	30	13	7.5	14
Vitamin E, α-TE <sup>3</sup>	10	8 <sup>4</sup>	25	12	9 <sup>4</sup>	24
Folate, µg	222	250	71	247	250	57
Vitamin B <sub>12</sub> , µg	4.9	3.2 <sup>4</sup>	13	6.6	3.2 <sup>4</sup>	5
Vitamin C, mg	111	75	25	98	90	51
Calcium, mg	984	750	20	1,182	750	15
Iron, mg	10	9 <sup>5</sup>	–	11	7	5
Iodine, µg	186	120 <sup>4</sup>	6	237	120 <sup>4</sup>	2
Selenium, µg	68	60 <sup>4</sup>	35	88	70 <sup>4</sup>	29
Zinc, mg	10	8	21	13	11	33

- The results presented in the table are based on the 2017 FinDiet Survey. <https://urn.fi/URN:ISBN:978-952-343-238-3>
- The estimated proportions of those falling short of the reference intakes are based on the distribution of intake in the modelled normal intake.
- Assuming a PUFA intake of 5% of energy intake. α-TE = α-tocopherol equivalents (i.e., 1 mg RRR α-tocopherol).
- Provisional average requirement
- The AR is not suitable for assessing the adequacy of iron intake in women of childbearing age. For postmenopausal women, the AR is 6 mg.

### Appendix 3. Salt intake in relation to nutrition recommendations in adults aged 18–74

Average daily calculated salt intake, the recommended intake and the proportion of those exceeding the recommended intake in Finnish women and men aged 18 to 74<sup>1</sup>.

Nutrient	Recommendation	Women		Men	
		Intake	Those exceeding the recommendation (%) <sup>2</sup>	Intake	Those exceeding the recommendation (%) <sup>2</sup>
Salt, g	< 5	6.4	86	8.7	98
Salt, g (without under-reporters) <sup>3</sup>	< 5	6.9	96	9.5	100

- 1 The results presented in the table are based on the 2017 FinDiet Survey. <https://urn.fi/URN:ISBN:978-952-343-238-3>
- 2 The estimated proportions of those exceeding the reference intakes are based on the distribution of intake in the modelled normal intake.
- 3 Underreporting means that the energy intake calculated based on the person's reported food consumption is below the person's estimated energy requirement based on gender, age and physical activity level. The calculation formula is based on the European Food Safety Authority (EFSA) EU Menu guidelines.

## Appendix 4. Environmental impacts of agriculture in Finland

**Together, the agricultural sector and land use produce about 30% of Finland's greenhouse gas emissions that cause climate change.**

- In 2022, greenhouse gas emissions from agriculture accounted for 14% of all emissions in Finland. Emissions decreased by 15% from 1990 to 2022, but in the 2000s they have remained at the same level.
- Greenhouse gas emissions from agricultural land use increased slightly from 1990 to 2022, largely due to the clearing of new fields on organic peatlands. In 2022, these emissions increased by 7% compared to the previous year.

**The cultivation of organic fields is the most significant cause of agriculture-related climate impact in Finland.**

- Organic fields produce as much greenhouse gas emissions as the rest of agricultural activities combined. These emissions are primarily controlled by means of control measures directed at agriculture.
- On organic soils, the cultivation of grass yields significantly less greenhouse gas emissions than the cultivation of annual crops. Currently, grasslands are mainly used for feed production for cattle or as fallow land (i.e. they do not produce crops). New uses of grasslands are being actively researched.

**The cattle economy plays a significant role in Finnish agriculture and the climate impact of agriculture.**

- The cattle economy is based on grasslands, and it is productive in Finland's natural conditions, also enabling food production in areas where the cultivation of cereals and special crops is challenging.
- The cattle economy generates a lot of greenhouse gas emissions. They arise from the cultivation of feedingstuffs, the digestion of cattle and manure treatment. On the other hand, grasslands that provide feed for cattle maintain the carbon stock of arable land, reduce nutrient leaching into waterways and play an important part in crop rotations that maintain soil fertility. Biodiversity can also be maintained by grazing cattle.
- In addition to grass fodder, cattle also eat cereals and rapeseed expeller to provide protein, which is mainly imported from abroad.

### **Diverse farming supports field soil fertility, carbon storage and biodiversity.**

- A varied, plant-focused diet supports crop diversification and is therefore a key means of developing the sustainability of agriculture. For example, legumes and plants that produce edible seeds such as hemp and flax diversify cultivation.
- Organic production widely follows crop rotations that diversify cultivation and uses legumes to bring nutrients that also benefit other crops in the crop rotation.

### **Biodiversity is affected by agricultural measures.**

- Around 12% of all species in Finland are endangered, and about 24% of these endangered species live on traditional agricultural biotopes such as meadows.
- The increased use of fertilisers and plant protection products over the last hundred years has also reduced the number of conventional species in agricultural environments.
- The development of agriculture has reduced biodiversity while making agricultural production more efficient, which has reduced the estimated climate impacts per unit of production.

### **Finland uses plant protection products to a significantly lower degree than southern and central European countries, for example.**

- Due to the cooler climate, plant protection products decompose and their concentrations in the environment decrease more slowly. So far, little research has been done on the environmental residues of plant protection products in Finland.
- Efforts are made to reduce the harm caused by plant protection products by only using them based on a real, identified need, and not preventively or as a matter of routine.

### **Agriculture is the largest eutrophic source of nutrient emissions in Finland.**

- The most nutrient emissions from agriculture come from arable farming. Since most of the arable land is used for animal feed cultivation, this cultivation causes the highest nutrient emissions in agriculture.
- Nutrient emissions can be reduced by maintaining year-round plant cover in fields, as well as by reducing erosion through other means and optimising fertilisation.

## Appendix 5. Reference values for energy intake and requirement for adults according to physical activity level<sup>1</sup>

Age, years	Weight <sup>2</sup> , kg	BMR <sup>3</sup> , MJ per day	Sedentary, PAL <sup>4</sup> 1.4 MJ per day	Average exercise, PAL 1.6 MJ per day	Active exercise, PAL 1.8 MJ per day
<b>Women</b>					
18–24	64.2	5.9	8.3	9.4	10.6
25–50	64.1	5.7	8.0	9.0	10.2
51–70	62.5	5.2	7.2	8.3	9.3
> 70	60.6	5.1	7.1	8.2	9.2
<b>Pregnant women<sup>5</sup></b>					
1st pregnancy trimester	64.1	5.7	8.2	9.3	10.5
2nd pregnancy trimester	69.0	5.7	9.1	10.2	11.4
3rd pregnancy trimester	75.2	5.7	10.2	11.3	12.5
<b>Lactating women<sup>6</sup></b>					
≤ 50	64.1	7.8	10.9	11.0	14.1
<b>Men</b>					
18–24	75.2	7.4	10.4	11.8	13.2
25–50	74.8	7.1	9.9	11.3	12.7
51–70	73.0	6.4	9.0	10.3	11.6
> 70	70.6	6.3	8.8	10.1	11.3

1 The figures are only applicable at group level due to the uncertainties in the assessment of both BMR and PAL.

2 Weight corresponds to a BMI of 23 and is based on the average weight of the Nordic population.

3 BMR = Basal metabolic rate.

4 PAL = Physical activity level.

5 The reference weights in the middle of each trimester, assuming a total weight gain of 14 kg during pregnancy and a weight of 64.1 kg before pregnancy (as in women aged 25 to 50). Additional energy requirements were added to the total energy consumption due to the accumulation of protein (697 g) and fat (4,365 g).

6 Exclusive breastfeeding for 0 to 6 months after childbirth.

## Appendix 6. Energy requirement reference values per kilogram of body weight for infants of 6 to 12 months

Age, months	Average energy requirement, kJ/kg	
	Girls	Boys
1	469	486
3	404	411
6	342	339
12	333	337

## Appendix 7. Energy requirement reference values for children and adolescents aged 2 to 17

Age, years <sup>1</sup>	Weight, kg	BMR <sup>2</sup> , MJ per day	Estimated energy requirement, MJ per day
1-3	13.6	3.3	4.6
4-6	20.7	4.0	6.3
7-10	30.8	4.9	7.8
<b>Girls</b>			
11-14	46.5	5.4	9.2
15-17	57.8	5.9	10.1
<b>Boys</b>			
11-14	48.2	6.2	10.5
15-17	65.6	7.5	12.7

1 The average physical activity levels for age groups: 1-3 years = 1.4; 4-10 years: 1.6; 11-17 years: 1.7

2 BMR=Basal metabolic rate

## Appendix 8. Recommended intakes of fat, carbohydrates and protein for adults and children over 2 years<sup>1</sup> (without alcohol and with fibre taken into account)

### Fat

- The proportion of monounsaturated fatty acids<sup>1</sup> should be 10 to 20% (E%) of the energy intake.
- The proportion of polyunsaturated fatty acids<sup>1</sup> should be 5 to 10 E%, of which at least 1 E% should be n-3 fatty acids.
- The proportion of essential fatty acids, i.e. linoleic acid and alpha-linolenic acid, should be at least 3 E%, of which at least 0.5 E% should be alpha-linolenic acid.
- Pregnant and lactating women should get at least 5 E% of essential fatty acids, of which 1 E% should be n-3 fatty acids. The intake of docosahexaenoic acid, DHA (22:6 n-3), should be 200 milligrams per day. In vegans, an adequate intake of alpha-linolenic acid ensures an adequate DHA status.
- At least two thirds of the intake of total fatty acids<sup>1</sup> should be monounsaturated and polyunsaturated fatty acids.<sup>1</sup>
- The intake of saturated fatty acids<sup>1</sup> should be limited to less than 10 E%.
- Trans fatty acid intake should be as low as possible.
- A total fat amount of 25–40 E% is recommended.

1 Expressed in triglycerides.

### Carbohydrates and dietary fiber

- Adults: The recommended dietary fiber for adults is at least 3 g/MJ, which corresponds to at least 25 g per day for women and at least 35 g per day for men with an indicative energy intake.
- Children: The recommended dietary fiber for children over two years of age is 2 to 3 g/MJ. For school-aged children, the intake of fibre must increase to match the intake of adults by puberty.
- The intake of free sugar<sup>2</sup> must be less than 10 E%.
- The recommended total amount of carbohydrates is 45 to 60 E%.

2 Free sugar includes sucrose, fructose, glucose, honey, syrups, starch sweeteners (glucose syrup, glucose-fructose syrups), sugar concentrates, other similar sugar preparations, fruit and berry juices and juice concentrates used as such or added to foods during preparation at home or in the food industry. The sugars contained in vegetables, berries and fruits eaten as such and used for cooking are not included in the definition of free sugar.

### Protein

- Adults and children above 2 years of age: The recommended protein intake is 10–20 E%.
- People over 70 years of age: The recommended protein intake is 15 to 20 E%, and if energy intake decreases (< 8 MJ per day), the proportion of proteins should increase accordingly.
- In adults, the average requirement for protein is 0.66 g/kg body weight, and the recommended intake is 0.83 g/kg.
- In older people, protein intake of 1.2 to 1.5 g/kg is recommended to prevent the deterioration of functional capacity. For people over 70 years of age, 18 E% is used in the planning and evaluation of nutrition, which corresponds to about 1.2 g/kg.
- The intake of essential amino acids can be secured with protein of animal origin, as well as by combining different sources of vegetable protein such as legumes and cereal products.

## Appendix 9. Recommended intakes of fat, carbohydrates and protein for infants of 6 to 23 months<sup>1</sup>

Age, months	E%
<b>6–11 months</b>	
Fat	30–45
Carbohydrates <sup>2</sup>	40–60, free sugar intake should be less than 10 E%
Protein	7–15
<b>12–23 months</b>	
Fat	30–40
Carbohydrates	45–60, free sugar intake should be less than 10 E%
Protein	10–15

- 1 Since exclusive breastfeeding is recommended for children under 6 months of age, they are not included in the recommendations. For children who do not receive breast milk, the recommended content of infant formula is defined in EU Regulation No 1243/2008 and Directive 2006/141. If complementary feeding is started at the age of 4 to 5 months, the recommendations concerning to 6 to 11 month-olds should be applied.
- 2 Includes energy from dietary fiber

### Fatty acids

- The proportion of n-6 fatty acids should be at least 4 E% at the age of 6 to 11 months and 3 E% at the age of 12 to 23 months.
- The proportion of n-3 fatty acids should be at least 1 E% at the age of 6 to 11 months and 0.5 E% at the age of 12 to 23 months.
- Trans fatty acid intake should be as low as possible.
- From the age of 12 months, the recommended intake of saturated and transfatty acids is the same as for older children and adults.
- From the age of 12 months, monounsaturated and polyunsaturated fatty acids must account for at least two thirds of the total intake of fatty acids.

### Carbohydrates and dietary fiber

- Foods and drinks containing free sugar should be avoided in the diet of children under 2 years of age.

### Protein

- The total protein intake should not exceed 10 to 15 E%.

## Appendix 10a. Recommended or adequate intakes\* of vitamins and choline by age group

Age group	Vitamin A RE <sup>2</sup>	Vitamin D µg <sup>3</sup>	Vitamin E α-TE <sup>4*</sup>	Vitamin K µg <sup>*</sup>	Choline mg <sup>*</sup>	Vitamin C mg <sup>5</sup>
≤ 6 months <sup>1</sup>			4		120	30 <sup>5</sup>
7–11 months	250	10	5	10	170	30 <sup>5</sup>
1–3 years	300	10	7	15	150	25
4–6 years	350	10	8	20	170	35
7–10 years	450	10	9	30	250	55
<b>Women</b>						
11–14 years	650	10	10	45	350	75
15–17 years	650	10	11	60	390	90
18–24 years	700	10	10	65	400	95
25–50 years	700	10	10	65	400	95
51–70 years	700	10	9	60	400	95
> 70 years	650	20 <sup>6</sup>	9	60	400	95
Pregnant women	750	10	11	80	480	105
Lactating women	1 400	10	12	65	520	155
<b>Men</b>						
11–14 years	700	10	11	50	330	80
15–17 years	750	10	12	65	400	105
18–24 years	800	10	11	75	400	110
25–50 years	800	10	11	75	400	110
51–70 years	800	10	11	70	400	110
> 70 years	750	20 <sup>6</sup>	11	70	400	110

- 1 Exclusive breastfeeding is the preferable source of nutrition for infants during the first six months of life. Values for infants 0-6 months represent adequate intake.
- 2 RE = Retinol equivalents (1 RE = 1 µg retinol = 2 µg of supplemental β-carotene, 6 µg of dietary β-carotene, or 12 µg other dietary provitamin A carotenoids, e.g., α-carotene and β-cryptoxanthin).
- 3 From 1 to 2 weeks of age, 10 µg of vitamin D<sub>3</sub> is recommended daily. For adults who do not spend time outdoors, the recommended intake is 20 µg per day.
- 4 Assuming a PUFA intake of 5 % of energy intake. α-TE = α-tocopherol equivalents (i.e., 1 mg RRR α-tocopherol).
- 5 The adequate intake is three times the amount known to prevent scurvy in infants.
- 6 For age group 75 years and older.

## Appendix 10b. Recommended or adequate intakes\* of vitamins by age group

Age group	Vitamin B <sub>12</sub> µg*	Folate µg	Thiamine mg/MJ	Riboflavin mg	Niasiini NE/MJ <sup>3</sup>	Vitamin B <sub>6</sub> mg	Pantothenic acid mg*	Biotin µg*
≤ 6 months <sup>1</sup>	0.4	64		0.3		0.1	2	4
7–11 months	1.5	90	0.1	0.4	1.6	0.4	3	5
1–3 years	1.5	120	0.1	0.6	1.6	0.6	4	20
4–6 years	1.7	140	0.1	0.7	1.6	0.7	4	25
7–10 years	2.5	200	0.1	1.0	1.6	1.0	4	25
<b>Women</b>								
11–14 years	3.5	280	0.1	1.4	1.6	1.3	5	35
15–17 years	4	310	0.1	1.6	1.6	1.5	5	35
18–24 years	4	330 <sup>2</sup>	0.1	1.6	1.6	1.6	5	40
25–50 years	4	330 <sup>2</sup>	0.1	1.6	1.6	1.6	5	40
51–70 years	4	330	0.1	1.6	1.6	1.6	5	40
> 70 years	4	330	0.1	1.6	1.6	1.6	5	40
Pregnant women	4.5	600	0.1	1.9	1.6	1.9	5	40
Lactating women	5.5	490	0.1	2.0	1.6	1.7	7	45
<b>Men</b>								
11–14 years	3	260	0.1	1.3	1.6	1.5	5	35
15–17 years	4	320	0.1	1.6	1.6	1.8	5	35
18–24 years	4	330	0.1	1.6	1.6	1.8	5	40
25–50 years	4	330	0.1	1.6	1.6	1.8	5	40
51–70 years	4	330	0.1	1.6	1.6	1.8	5	40
> 70 years	4	330	0.1	1.6	1.6	1.7	5	40

- 1 Exclusive breastfeeding is the preferable source of nutrition for infants during the first six months of life. Values for infants 0–6 months represent adequate intake.
- 2 RI for females in reproductive age does not include the recommended supplementation of folic acid for females before and during the first trimester of pregnancy. The recommendation for pregnant females is not including folic acid supplementation before and during pregnancy.
- 3 NE = Niacin equivalent (1 NE = 1 mg niacin = 60 mg tryptophan).

## Appendix 10c. Recommended mineral intakes by age group

Age group	Calcium mg	Iron mg	Zinc mg	Copper µg
≤ 6 months <sup>1</sup>	120			200
7–11 months	310 <sup>2</sup>	10	3	220
1–3 years	450	7	4.5	340
4–6 years	800	7	5.8	400
7–10 years	800	9	7.7	570
<b>Women</b>				
11–14 years	1,150	13 <sup>3</sup>	10.8	780
15–17 years	1,150	15 <sup>4</sup>	12.2	880
18–24 years	1,000	15	9.7	900
25–50 years	950	15	9.7	900
51–70 years	950	8 <sup>5</sup>	9.5	900
> 70 years	950	7	9.3	900
Pregnant women	950	26 <sup>6</sup>	11.3	1000
Lactating women	950	15	12.6	1300
<b>Men</b>				
11–14 years	1,150	11	11.1	740
15–17 years	1,150	11	14.0	900
18–24 years	1,000	9	12.7	900
25–50 years	950	9	12.7	900
51–70 years	950	9	12.4	900
> 70 years	950	9	12.1	900

- 1 Exclusive breastfeeding is the preferable source of nutrition for infants during the first six months of life. Values for infants 0–6 months represent adequate intake.
- 2 Adequate intake, derived from exclusively breastfed infants aged 0 to 6 months.
- 3 If menstruating: 15 mg/d.
- 4 If large menstruation bleedings, screening of iron status and supplementation as indicated.
- 5 If still menstruating, the RI for 25–50 y (15 mg/d) should be used.
- 6 Screening of iron status and supplementation as indicated is recommended.

## Appendix 10d. Adequate intakes of minerals by age group

Age group	Phosphorus mg <sup>2</sup>	Potassium mg	Magnesium mg	Iodine µg	Selenium µg	Fluoride mg <sup>5</sup>	Manganese mg	Molybdenum µg
≤ 6 months <sup>1</sup>		400	25	80–90 <sup>4</sup>	10		12	
7–11 months	170	700	80 <sup>3</sup>	80–90 <sup>4</sup>	20	0.4	0.02– 0.5 <sup>6</sup>	10
1–3 years	250	850	170	100	20	0.7	0.5	15
4–6 years	440	1,150	230	100	25	1.0	1.0	20
7–10 years	440	1,800	230	100	40	1.5	1.5	30
<b>Women</b>								
11–14 years	640	2,400	250	120	60	2.3	2	50
15–17 years	640	2,850	250	120	70	2.9	3	60
18–24 years	550	3,500	300	150	75	3.2	3	65
25–50 years	520	3,500	300	150	75	3.2	3	65
51–70 years	520	3,500	300	150	75	3.1	3	65
> 70 years	520	3,500	300	150	75	3.0	3	65
Pregnant women	530	3,500	300	200	90	3.1	3	70
Lactating women	530	3,500	300	200	85	3.1	3	65
<b>Men</b>								
11–14 years	640	2,550	300	130	65	2.4	2	45
15–17 years	640	3,400	300	140	85	3.3	2.5	60
18–24 years	550	3,500	350	150	90	3.8	3	65
25–50 years	520	3,500	350	150	90	3.7	3	65
51–70 years	520	3,500	350	150	90	3.7	3	65
> 70 years	520	3,500	350	150	85	3.5	3	65

- 1 Exclusive breastfeeding is the preferable source of nutrition for infants during the first six months of life. Values for infants 0-6 months are AIs based on estimated intake from human milk.
- 2 Assuming the RI of calcium is consumed.
- 3 The value has been derived from exclusive breastfed infants aged 0 to 6 months.
- 4 The Adequate intake for iodine in infants < 1 y is presented as a range with 80 µg/d in iodine sufficient populations and 90 µg/d in populations with mild to moderate iodine deficiency.
- 5 Based on an adequate intake of 0.05 mg/kg bodyweight, using population reference weights. For pregnant and lactating women, this refers to pre-pregnancy weight.
- 6 Range based on upwards extrapolation from intake of infants 0-6 months, the mean of observed intakes and downwards extrapolation from adult AI.

## Annex 11a. Average requirements or provisional average requirements\* for vitamins and choline by age group

Age group	Vitamin A RE <sup>2</sup>	Vitamin D µg <sup>3</sup>	Vitamin E α-TE <sup>4*</sup>	Vitamin K µg <sup>*</sup>	Choline mg <sup>*</sup>	Vitamin C mg
≤ 6 months <sup>1</sup>			3		96	25
7–11 months	200	7.5	4	5	134	25
1–3 years	240	7.5	6	10	119	20
4–6 years	270	7.5	7	15	139	30
7–10 years	340	7.5	7	25	199	45
<b>Women</b>						
11–14 years	490	7.5	8	35	276	60
15–17 years	500	7.5	9	45	310	75
18–24 years	540	7.5	8	50	320	75
25–50 years	540	7.5	8	50	320	75
51–70 years	530	7.5	8	50	320	75
> 70 years	510	7.5	8	50	320	75
Pregnant women	590	7.5	9	60	381	75
Lactating women	1,060	7.5	9	50	416	75
<b>Men</b>						
11–14 years	520	7.5	10	40	259	65
15–17 years	600	7.5	9	50	318	85
18–24 years	630	7.5	9	60	320	90
25–50 years	630	7.5	9	60	320	90
51–70 years	610	7.5	9	60	320	90
> 70 years	590	7.5	9	55	320	90

1 Exclusive breastfeeding is the preferable source of nutrition for infants during the first six months of life. Values for infants 0-6 months represent provisional average requirement from breast milk.

2 RE = Retinol equivalents (1 RE = 1 µg retinol = 2 µg of supplemental β-carotene, 6 µg of dietary β-carotene, or 12 µg other dietary provitamin A carotenoids, e.g., α-carotene and β-cryptoxanthin).

3 From 1 to 2 weeks of age, 10 µg of vitamin D3 is recommended daily. For adults who do not spend time outdoors, the recommended intake is 20 µg per day.

4 Assuming a PUFA intake of 5 % of energy intake. α-TE = α-tocopherol equivalents (i.e., 1 mg RRR α-tocopherol).

## Appendix 11b. Average requirements or provisional average requirements\* for vitamins by age group

Age group	Vitamin B <sub>12</sub> µg*	Folate µg	Thiamine mg/MJ	Ribo-flavin mg	Niasini NE/MJ <sup>2</sup>	Vitamin B <sub>6</sub> mg	Pantothenic acid mg	Biotin µg
≤ 6 kk <sup>1</sup>	0.3	50		0.2		0.1	1.6	3
7-11 months	1.1	70	0.07	0.3	1.3	0.3	2.2	4
1-3 years	1.2	90	0.07	0.5	1.3	0.5	3.2	16
4-6 years	1.4	110	0.07	0.6	1.3	0.6	3.2	20
7-10 years	2	160	0.07	0.8	1.3	0.9	3.2	20
<b>Women</b>								
11-14 years	2.8	220	0.07	1.2	1.3	1.1	4	28
15-17 years	3.1	240	0.07	1.3	1.3	1.3	4	28
18-24 years	3.2	250	0.07	1.3	1.3	1.3	4	32
25-50 years	3.2	250	0.07	1.3	1.3	1.3	4	32
51-70 years	3.2	250	0.07	1.3	1.3	1.3	4	32
> 70 years	3.2	250	0.07	1.3	1.3	1.3	4	32
Pregnant women	3.6	480	0.07	1.6	1.3	1.5	4	32
Lactating women	4.2	380	0.07	1.6	1.3	1.4	5.6	35
<b>Men</b>								
11-14 years	2.6	200	0.07	1.1	1.3	1.2	4	28
15-17 years	3.2	250	0.07	1.3	1.3	1.5	4	28
18-24 years	3.2	250	0.07	1.3	1.3	1.5	4	32
25-50 years	3.2	250	0.07	1.3	1.3	1.5	4	32
51-70 years	3.2	250	0.07	1.3	1.3	1.5	4	32
> 70 years	3.2	250	0.07	1.3	1.3	1.5	4	32

1 Exclusive breastfeeding is the preferable source of nutrition for infants during the first six months of life. Values for infants 0-6 months represent provisional average requirement from breast milk.

2 NE = Niacin equivalent (1 NE = 1 mg niacin = 60 mg tryptophan).

## Appendix 11c. Average requirements for minerals by age group

Age group	Calcium mg	Iron mg	Zinc <sup>2</sup> mg	Copper µg
≤ 6 kk <sup>1</sup>	96			160
7–11 months	250 <sup>3</sup>	8	2.5	180
1–3 years	400	6	3.8	260
4–6 years	700	5	4.8	300
7–10 years	675	7	6.4	440
<b>Women</b>				
11–14 years	980	10	9	600
15–17 years	980	9	10.2	680
18–24 years	870	9	8.1	700
25–50 years	750	9	8.1	700
51–70 years	750	6	7.9	700
> 70 years	750	6	7.7	700
Pregnant women	800	20	9.4	800
Lactating women	800	9	10.5	1 000
<b>Men</b>				
11–14 years	980	9	9.2	570
15–17 years	980	9	11.7	700
18–24 years	870	7	10.6	700
25–50 years	750	7	10.6	700
51–70 years	750	7	10.4	700
> 70 years	750	7	10.1	700

- 1 Exclusive breastfeeding is the preferable source of nutrition for infants during the first six months of life. Values for infants 0–6 months represent provisional average requirement from breast milk.
- 2 This is based on an assumed mixed diet with a phytic acid intake of around 600 mg per day.
- 3 The value has been derived from exclusively breastfed infants aged 0 to 6 months.

## Appendix 11d. Provisional average requirements for minerals by age group

Age group	Phosphorus mg <sup>2</sup>	Potassium mg	Magnesium mg	Iodine µg	Selenium µg	Fluoride mg	Manganese mg	Molybdenum µg
≤ 6 kk <sup>1</sup>		320	20	64–72	10		9.6 µg	
7–11 months	140	600	64	64–72	15	0.4	0.02–0.4	7
1–3 years	200	700	136	80	15	0.5	0.5	10
4–6 years	350	900	184	80	20	0.8	0.7	16
7–10 years	350	1,450	184	80	35	1.2	1.1	24
<b>Women</b>								
11–14 years	510	1,900	200	100	50	1.9	1.8	38
15–17 years	510	2,250	200	100	55	2.3	2.2	48
18–24 years	440	2,800	240	120	60	2.6	2.4	52
25–50 years	420	2,800	240	120	60	2.6	2.4	52
51–70 years	420	2,800	240	120	60	2.5	2.4	52
> 70 years	420	2,800	240	120	60	2.4	2.4	52
Pregnant women	430	2,800	240	160	75	2.5	2.5	55
Lactating women	430	2,800	240	160	70	2.5	2.3	51
<b>Men</b>								
11–14 years	510	2,050	240	100	50	1.9	1.6	34
15–17 years	510	2,700	240	110	70	2.6	2.1	46
18–24 years	440	2,800	280	120	70	3	2.4	52
25–50 years	420	2,800	280	120	70	3	2.4	52
51–70 years	420	2,800	280	120	70	2.9	2.4	52
> 70 years	420	2,800	280	120	70	2.8	2.4	52

1 Exclusive breastfeeding is the preferable source of nutrition for infants during the first six months of life. Values for infants 0–6 months represent provisional average requirement from breast milk.

2 This is based on the assumption that calcium intake meets the recommendations.

## Appendix 12. Tolerable upper intake level (UL) of vitamins and minerals in adults and children

Vitamin or mineral	UL per day, adults	UL per day, children <sup>1</sup>
Vitamin A <sup>2</sup>	3,000 µg	1–3 years • 800 µg 4–6 years • 1,100 µg 7–10 years • 1,500 µg 11–14 years • 2,000 µg 15–17 years • 2,600 µg
Vitamin D	100 µg	0–6 months • 25 µg 7–11 months • 35 µg 1–10 years • 50 µg 11–17 years • 100 µg
Vitamin E	300 mg	1–3 years • 100 mg 4–6 years • 120 mg 7–10 years • 160 mg 11–14 years • 220 mg 15–17 years • 260 mg
Folic acid	1,000 µg	4–11 months • 200 µg 1–3 years • 200 µg 4–6 years • 300 µg 7–10 years • 400 µg 11–14 years • 600 µg 15–17 years • 800 µg
Niacin nicotinamide	900 mg	1–3 years • 150 mg 4–6 years • 220 mg 7–10 years • 350 mg 11–14 years • 500 mg 15–17 years • 700 mg
nicotinic acid	10 mg	1–3 years • 2 mg 4–6 years • 3 mg 7–10 years • 4 mg 11–14 years • 6 mg 15–17 years • 8 mg
Vitamin B <sub>6</sub>	12 mg	4–6 months • 2.2 mg 7–11 months • 2.5 mg 1–3 years • 3.2 mg 4–6 years • 4.5 mg 7–10 years • 6.1 mg 11–14 years • 8.6 mg 15–17 years • 10.7 mg
Calcium	2,500 mg	–
Iron	60 mg	–
Zinc	25 mg	1–3 years • 7 mg 4–6 years • 10 mg 7–10 years • 13 mg 11–14 years • 18 mg 15–17 years • 22 mg

Vitamin or mineral	UL per day, adults	UL per day, children <sup>1</sup>
Selenium	255 µg	4–6 months • 45 µg 7–11 months • 55 µg 1–3 years • 70 µg 4–6 years • 95 µg 7–10 years • 130 µg 11–14 years • 180 µg 15–17 years • 230 µg
Magnesium <sup>3</sup>	250 mg	1–3 years (no data) others: 250 mg
Phosphorus	3,000 mg	–
Iodine	600 µg	1–3 years • 200 µg 4–6 years • 250 µg 7–10 years • 300 µg 11–14 years • 450 µg 15–17 years • 500 µg
Fluoride	7 mg	1–3 years • 1,5 mg 4–8 years • 2,5 mg 9–14 years • 5 mg 15–17 years • 7 mg
Copper	5 mg	1–3 years • 1 mg 4–6 years • 2 mg 7–10 years • 3 mg 11–14 years • 4 mg 15–17 years • 4 mg
Manganese	8 mg	4–12 months • 2 mg 1–2 years • 4 mg 3–6 years • 5 mg 7–13 years • 6 mg 14–17 years • 7 mg
Molybdenum	0.6 mg	1–3 years • 0.1 mg 4–6 years • 0.2 mg 7–10 years • 0.25 mg 11–14 years • 0.4 mg 15–17 years • 0.5 mg
Boron	10 mg	1–3 years • 3 mg 4–6 years • 4 mg 7–10 years • 5 mg 11–14 years • 7 mg 15–17 years • 9 mg

1 According to the European Food Safety Authority, EFSA.

2 The unit of vitamin A is retinol equivalent (RE). 1 RE is equivalent to 1 µg of retinol from dietary supplements, 2 µg of β-carotene from dietary supplements, 6 µg of β-carotene from food and 12 µg of other dietary carotenoids (e.g. α-carotene and β-cryptoxanthin).

3 The UL value only applies to magnesium intake as a dietary supplement, and it is based on mild diarrhoea caused by magnesium intake as a dietary supplement.

## Appendix 13. Creation and modelling of the food-based dietary guidelines

**The preparation of these health-promoting and environmentally friendly food-based dietary guidelines consisted of five steps, the first four of which were mainly carried out in Nordic cooperation.**

**In the first phase**, the health effects of each food group were assessed, which meant reviewing the research evidence on the links between food consumption, chronic diseases and mortality. The quantitative recommendations for the consumption of vegetables, berries, fruits, cereals, fish, red meat and nuts are based on a dose–response relationship between food consumption and health effects.

**The second phase** assessed the importance of different food groups as a source of essential nutrients in the Nordic countries and Finland. For example, the recommendation for dairy products is based on their central role as sources of calcium, iodine, riboflavin and vitamin B<sub>12</sub>. Similarly, the recommendation for the use of vegetable oils is based on an adequate intake of essential fatty acids, linoleic acid (n-6) and alpha-linolenic acid (n-3).

**In the third phase**, the importance of food groups as risk factors for the most common chronic diseases was assessed. In the Nordic and Baltic countries, a low consumption of whole grains, vegetables, berries and fruits, and a high consumption of processed and red meat are the most significant nutritional risk factors for chronic diseases. In Finland, high salt intake is also a significant risk factor.

**The fourth phase** reviewed the research evidence on the environmental impacts of the consumption of various foods by food groups, and more detailed qualitative recommendations were created concerning choices that aim to minimise the environmental impacts. The recommended increase in the use of legumes is based on their beneficial nutrient content as well as their low environmental impact. The increased consumption of potatoes is also based on both the low environmental impact and the moderate nutrient content. The recommended decrease in the consumption of poultry meat is based on reducing the environmental impact. As for sweets, other foods and beverages containing free sugar, and alcohol, their harmful composition and their environmental impact justify their minimal proportion in the diet.

**In the fifth phase**, the national expert group evaluated and modelled the nutritional adequacy and environmental impact of diets in line with the Nordic food-based dietary guidelines in the Finnish food environment. Separate evaluations were made food-based dietary guidelines for diets with the recommended energy content for adults (women and men) and for children (of 1–3 years and 4–6 years). In the planning of diets, national food habits were taken into account, and the food products meeting the recommendations were selected from the foods most commonly consumed by adults (FinDiet 2017) and children (DAGIS study in 2015–2016). This ensured the acceptability and accessibility of the selections (availability and price). Where possible, the evaluation also considered differences between population groups in food consumption and nutrient intake to promote social sustainability.

The most important aspect of the food-based dietary guidelines is the nutritional adequacy of the diet and its health effects, and all quantitative recommendations are based on them. Health-promoting and environmentally-friendly choices are seldom in conflict. For environmental reasons, the consumption of red meat should be significantly lower than the Nordic recommendation (up to 350 grams per week), and the recommended nutrient intake can be achieved without red meat. When selecting fish species, environmental impacts should also be taken into account. A high consumption of cheese has more adverse environmental effects than that of liquid dairy products. Food-based dietary guidelines that are more ambitious in reducing adverse environmental impacts than the Nordic recommendations are in line with international and the Nordic Council of Ministers' objectives.

## Appendix 14a. Criteria for main dishes in food service

Main dish type	Nutrient content per 100 g, maximum		
	Fat g	Saturated fat g	Salt g
Main dish porridges* At least 6 g /100 g of fibre in the flakes etc.	3	1	0.5
Soups*	3 (5)**	1 (1.5)	0.5***-0.7
Casseroles, risottos, pasta meals	5 (7)	2 (2)	0.6***-0.75
Main dish sauces (e.g. vegetable curry, chicken sauce)	9 (11)**	3.5 (3.5)	0.9
Foods served in pieces with or without sauce	8 (12)**	3 (3.5)	0.9

\* If a soup or porridge meal is served with bread and toppings (e.g. cold cuts or cheese), they should meet of the Heart Symbol criteria.

\*\* The figures in brackets concern fish meals.

\*\*\* The range for salt intake, in which the lower level applies to food served to children and is also a longer-term goal for everyone.

## Appendix 14b. Criteria for potato and cereal side dishes in food service

Side dish type	Nutrient content per 100 g			
	Fat g	Saturated fat g	Salt g	Fibre (of dry weight) g
Pasta	–*	Up to 0.7	Up to 0.3	At least 6
Barley groats, cereals, cereal and vegetable mixes etc.	–	Up to 0.7	Up to 0.3	At least 6
Wholegrain rice, rice and vegetable mix	–	Up to 0.7	Up to 0.3	At least 3
Boiled potatoes	No added fat	–	No added salt	–
Other potato side dishes (e.g. mashed potatoes, wedged potatoes, potato and vegetable mix)	–	Up to 0.7	Up to 0.3**–0.5	–

\*(-) No criterion for this factor.

\*\* The range for salt intake, in which the lower level applies to food served to children and is also a longer-term goal for everyone.

## Appendix 14c. Criteria for other parts of the meal in food service

Meal component	Nutrient content per 100 g			
	Fat %	Saturated fat %	Salt g	Fibre g
Bread	–	–	Fresh bread, up to 0.9 Crisp bread, up to 1.2	At least 6  At least 10
Spread for bread	At least 60	Up to 30	Up to 1.0	–
Milk or buttermilk Plant-based drinks	Up to 0.5 Up to 2	–**	–	–
Vegetable side dish - fresh vegetables	–	In a marinade up to 20	No added salt	–
Vegetable side dish - cooked vegetables*	–	In a marinade up to 20	Up to 0.3	–
Salad dressing	Preferably 25 or more	Up to 20	Up to 1.0	–
Oil for salad		Up to 20		

\* For cooked vegetables, all fat that meet the Heart Symbol criteria (e.g. oil, margarine or a liquid vegetable fat product) can also be used.

\*\* Plant-based drinks should contain sugar up to 5 grams per 100 grams and salt up to 0.13 grams per 100 grams.

## Appendix 15. Experts involved in theme groups and modelling

Expert	Organisation
Iris Erlund	Finnish Institute for Health and Welfare (THL)
Riitta Freese	University of Helsinki
Kristiina Janhonen	Finnish Institute for Health and Welfare (THL)
Niina Kaartinen*	Finnish Institute for Health and Welfare (THL)
Sanna Kiuru	Finnish Food Authority
Liisa Korkalo	University of Helsinki
Heli Kuusipalo	Finnish Institute for Health and Welfare (THL)
Venla Kyttä	Natural Resources Institute Finland (Luke)
Elina Leinonen	Finnish Food Authority
Taru Lindblom	University of Helsinki
Päivi Mäki	Finnish Institute for Health and Welfare (THL)
Sari Niinistö	Finnish Institute for Health and Welfare (THL)
Henna Peltonen	University of Helsinki
Oona Pietiläinen	Natural Resources Institute Finland (Luke)
Susanna Raulio*	Finnish Institute for Health and Welfare (THL)
Elina Särmälä	Saimaan tukipalvelut Oy
Sanna Talvia	University of Helsinki
Heli Tapanainen	Finnish Institute for Health and Welfare (THL)

\* We thank Niina Kaartinen, who participated in several working groups, and Susanna Raulio, the chair of the food services theme group, for their significant work contribution.

## Appendix 16. Expert consultations on the national recommendations

Expert	Organisation
Katja Borodulin	Age Institute
Mikael Fogelholm	University of Helsinki
Mikaela Grotenfelt-Engren	Finnish Institute for Health and Welfare (THL)
Arja Heinonen	Finnish Food Authority
Juha Helenius	University of Helsinki
Janne Huovila	Finnish Cancer Society
Miika Ilomäki	National Emergency Supply Agency
Piia Jallinoja	University of Tampere
Tarja Kaipainen	Association of Clinical and Public Health Nutritionists in Finland (RTY)
Anna Kara	Finnish Heart Association
Virpi Kemi	Professional kitchen experts' association
Seppo Knuuttila	Finnish Environment Institute (Syke)
Hanna Konttinen	University of Helsinki
Kaisa Kukkonen	Finnish Food Authority
Matti Kummu	Aalto University
Anne-Maria Pajari	University of Helsinki
Päivi Palojoiki	University of Helsinki
Timo Partonen	Finnish Institute for Health and Welfare (THL)
Kirsi Pietiläinen	HUS
Eeva Rantala	Finnish Institute for Health and Welfare (THL)
Heli Reinivuo	Finnish Institute for Health and Welfare (THL)
Anu Ruusunen	University of Eastern Finland
Maija Soljanlahti	John Nurminen Foundation
Johanna Suomi	Finnish Food Authority
Tanja Talvenheimo	National Emergency Supply Agency
Anna-Maria Teeriniemi	Kainuu wellbeing services county
Tanja Tilles-Tirkkonen	City of Kuopio
Hanna Tuomisto	University of Helsinki
Minna Vanhala	Kotitalousopettajien liitto ry
Silja Varjonen	Finnish Society for Food Education Ruukku
Henna Vepsäläinen	University of Helsinki
Auli Väänänen	Ministry of Agriculture and Forestry
Kati Kuisma	Finnish Heart Association

## **SUSTAINABLE HEALTH FROM FOOD** **– National Nutrition Recommendations 2024**

Sustainable Health from Food – National Nutrition Recommendations 2024 aim to promote the health of the population, address nutritional and health problems, and reduce the adverse environmental impacts of food consumption and production.

Nutrition recommendations are intended to be used in healthcare, food service meal planning, food product development, communications and nutrition

education. The publication contains dietary reference values for energy and nutrient intakes, food-based dietary guidelines and instructions for the implementation and application of the recommendations.

Sustainable Health from Food – National Nutrition Recommendations 2024 are based on the Nordic Nutrition Recommendations published in summer 2023, which were created by reviewing the latest research evidence on the associations between nutrition and health and the environmental impact of food production and consumption. The recommendations also take into account current information about the food consumption and nutrient intakes of Finnish adults and children.

The nutrition recommendations provide a basis for nutrition guidance, food education and communication, which aim to influence the population's food habits and nutrient intakes. The recommended plant-based diets combine variety, balance, enjoyment and moderation.

