BEANS & GREENS

Magazine for trainees and students

Basics of vegan-vegetarian nutrition

CULSUS

EPIZ Globales Lernen in Berlin

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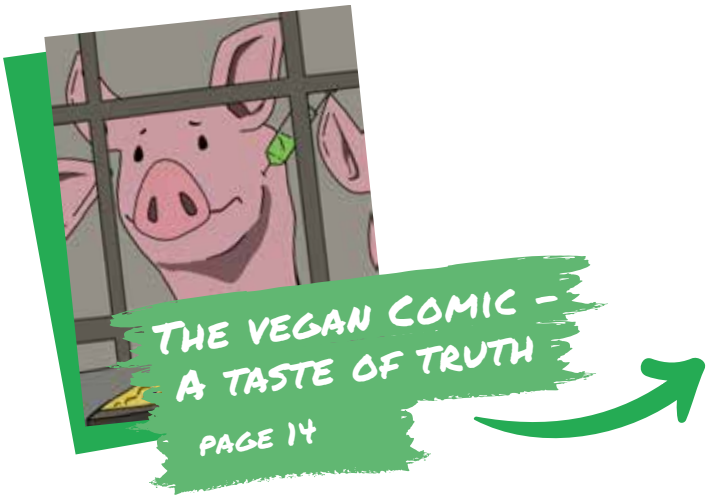


Fact sheets for milk alternatives

31 ff.

Dear trainees,

In this *Beans & Greens* magazine series you can immerse yourself in the world of vegan and vegetarian cuisine. Discover lots of interesting facts about sustainable ingredients and creative preparation methods that will enrich your cooking skills. Learn how to prepare delicious dishes without animal products and be inspired by the diversity of plant-based nutrition.

This issue is all about the basics: What different diets are there? Why do people opt for a vegan-vegetarian diet? How can you eat a healthy vegan-vegetarian diet? And which ingredients are particularly environmentally friendly?

This issue of *Beans & Greens* also looks at milk alternatives: What milk alternatives are there? How environmentally friendly are they? And what can I use milk alternatives for?

We hope you enjoy discovering and experimenting.

The EPIZ – Centre for Global Learning Team

There are a few symbols that you will come across repeatedly in the magazine:

- This symbol shows additional information
- Scan this code to hear the audio version of the text.
- Scan this code to watch a video on the topic.
- This symbol shows the level of difficulty of the recipe.
- This symbol shows the servings for each recipe.
- This symbol is followed by an exercise.

You may also notice that some numbers appear in the texts [as here]. These numbers are references and refer to the list of sources at the back of the booklet.

DIET-CHECK

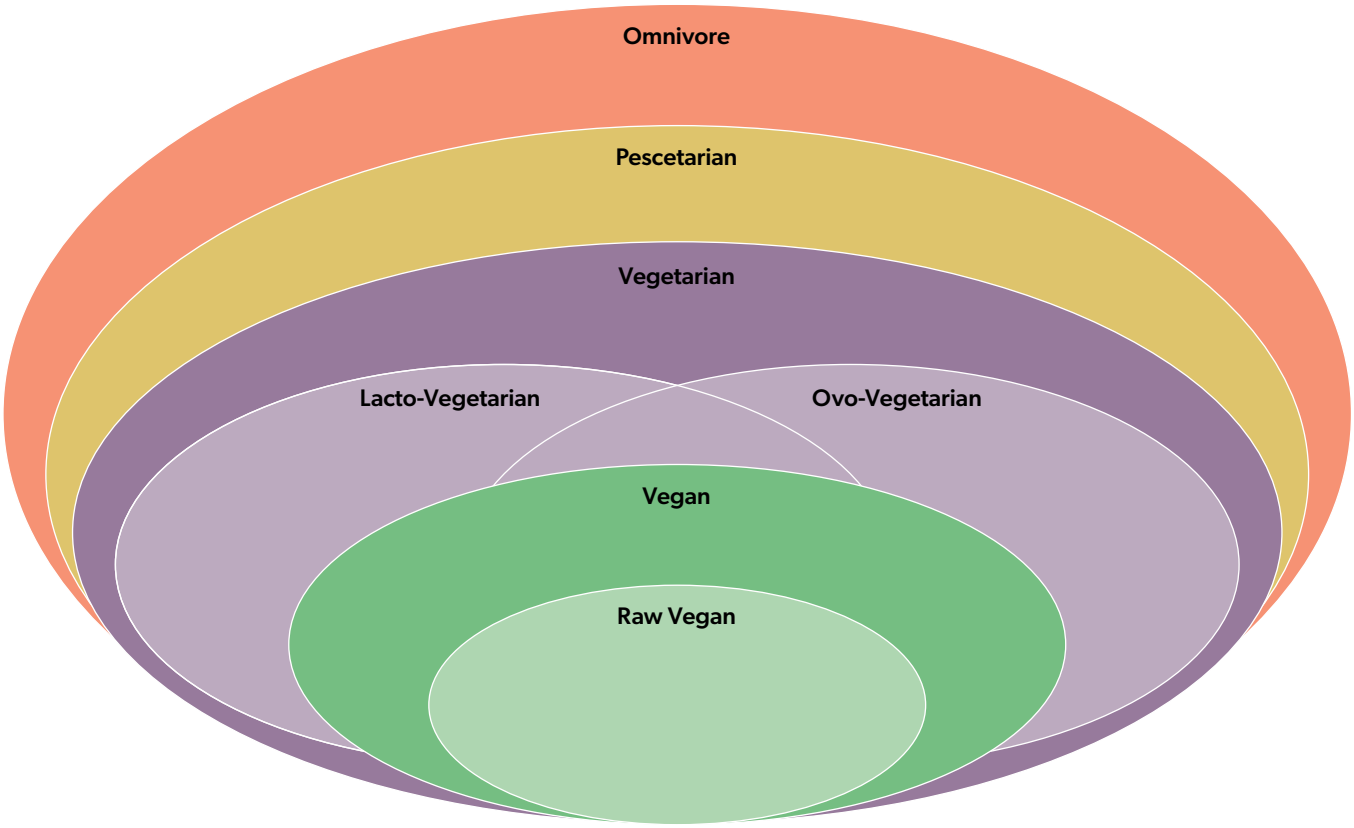


Figure 1: Overview of diet types

The diversity of diets continues to increase, each day guests come with new demands and desires for their meals. The chefs and service staff are often overwhelmed by which products belong to which diets. Your boss has asked you to create an overview of the diets and the corresponding ingredients, which will be displayed in the kitchen. Research online and match the following foods to the corresponding diets in the graphic:

Poultry, Egg Yolk, Fish, Butter, Nuts, Legumes, Red Meat, Cooked Vegetables, Fruit, Mussels, Milk, Alcohol, Seeds, White Meat, Seafood, Yogurt, Raw Vegetables, Cheese, Bread, Honey, Egg White

Which products that you often use are still missing from the overview?

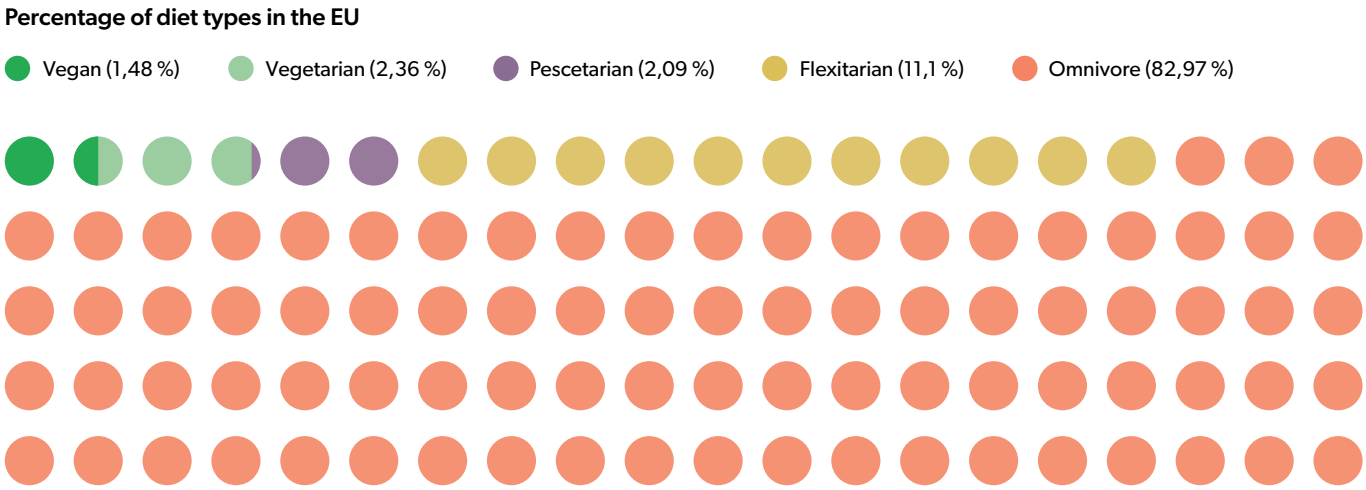


Figure 2: Percentages of diet types in the EU [1, 2]

The variety of diets is enormous, people have unique and individual ways of eating. What characterises certain types of diets and why do you think people choose the diets in the overview? Think of at least one reason for following each type of diet. Afterwards reflect why you eat like you do.

Diet	Characteristics	Reasons and Arguments
Omnivore		
Pescetarian		
Vegetarian		
Vegan		
BONUS: Flexitarian		

Reflect: Does this statistic align with your experiences? Do most of your family members, friends, and colleagues eat meat? Or do you also know many people who have different diets?

TRACING THE MEAT

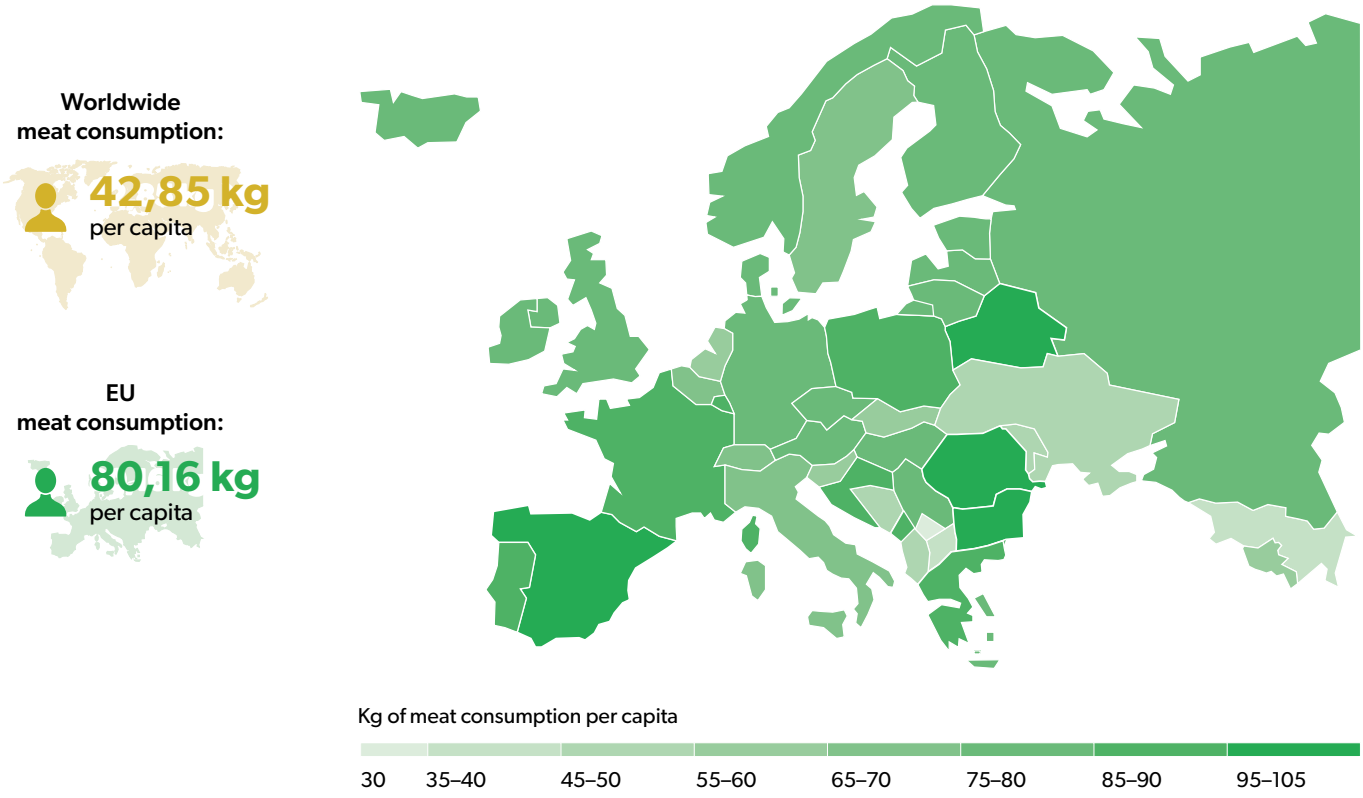


Figure 3: European meat consumption per capita by country [3]

British singer Paul McCartney once said in an interview: "If slaughterhouses had glass walls, everyone would be vegetarian [4]." Is that true? Most people know a lot about the conditions in factory farming. But in everyday life, we manage to ignore this for the sake of enjoyment. Supermarkets make it easy for us. There we can buy meat and pre-packaged meat products which do not remind us of the animal from which it comes.

In Europe, almost twice as much meat is consumed as the global average. Spain tops the list with around 100 kg per person per year, followed by Portugal with 94 kg. Georgia is at the bottom with 38 kg per year. Germany is in the upper middle range with about 76 kg per year, closely followed by Estonia with 72 kg and Bulgaria with about 62 kg. Worldwide meat consumption has doubled since 1960. Americans lead globally in meat consumption with an average of 127 kg per person per year [3].

Poultry and pork account for about three-quarters of the world's meat consumption. The consumption of poultry, has increased fivefold since 1960. Today, about 73 billion chickens are slaughtered each year – that's about 200 million chickens per day or 139,000 chickens per minute [3, 5]. This high meat consumption often leads to the inhumane treatment of domesticated animals.

What is it like in your home country? Which vegetarian or vegan national dishes do you know? Exchange ideas with friends and your team. List some examples of vegan or vegetarian traditional dishes here:

ENVIRONMENTAL IMPACTS OF ANIMAL PRODUCTS

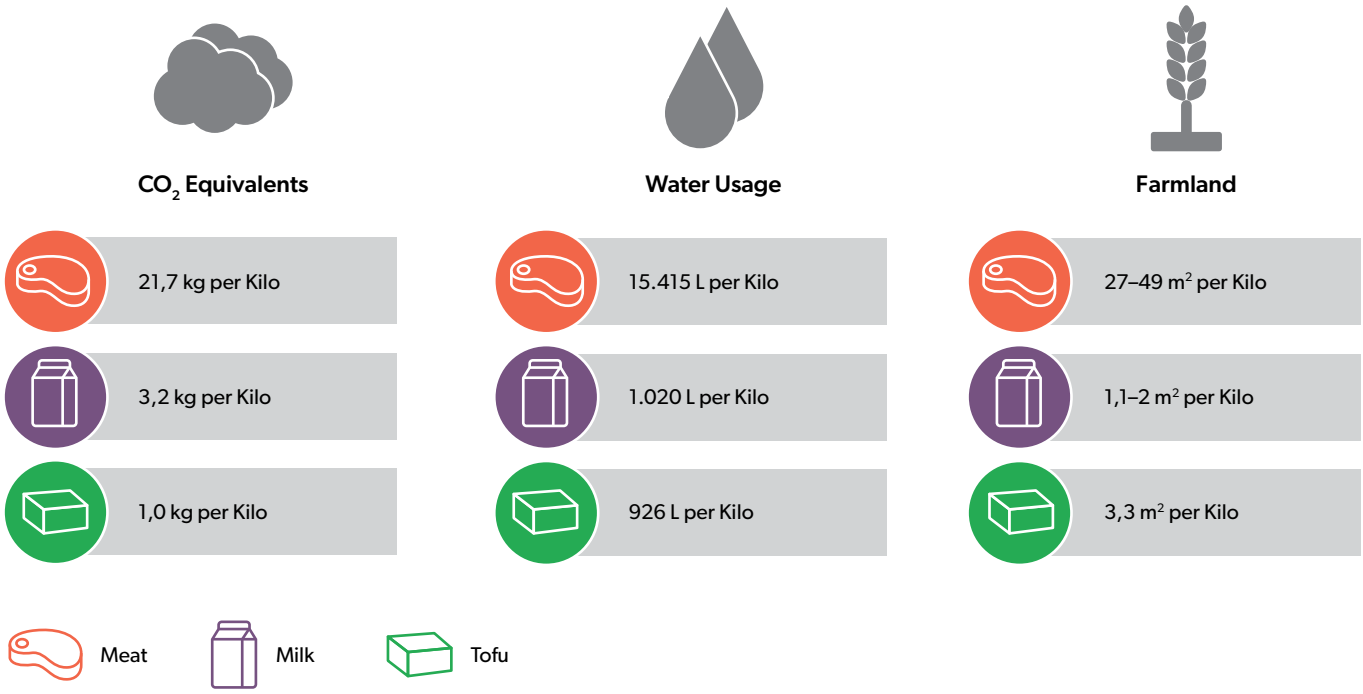
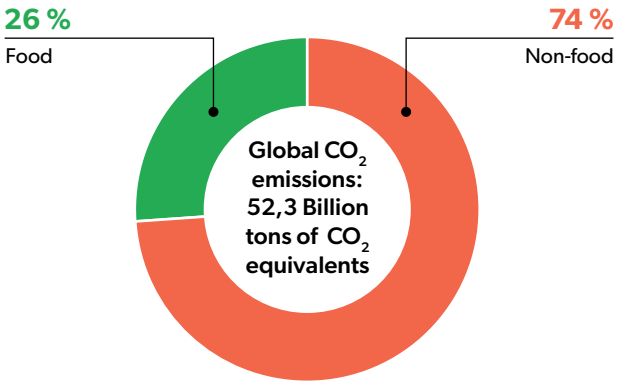


Figure 4: Environmental footprint of beef, milk and tofu [6–11]

The ecological footprint measures the impact of our daily activities and lifestyle on the environment by capturing aspects such as our water consumption, CO_2 emissions, and land use required for our lifestyle. It also considers the "hidden" costs, such as the water and land needed for livestock feed. The chart clearly shows that animal products tend to require more resources than plant-based ones. But why is that? Let's take a closer look at the individual areas.

Greenhouse Gases

CO_2 equivalents are a unit of measurement used to compare the climate impact of different greenhouse gases. Since greenhouse gases like methane and nitrous oxide have a stronger warming effect than carbon dioxide, their emissions are often measured in CO_2 equivalents. For example, methane has 25 times the climate impact of CO_2, with nitrous oxide having an astonishing 298 times the impact [12].



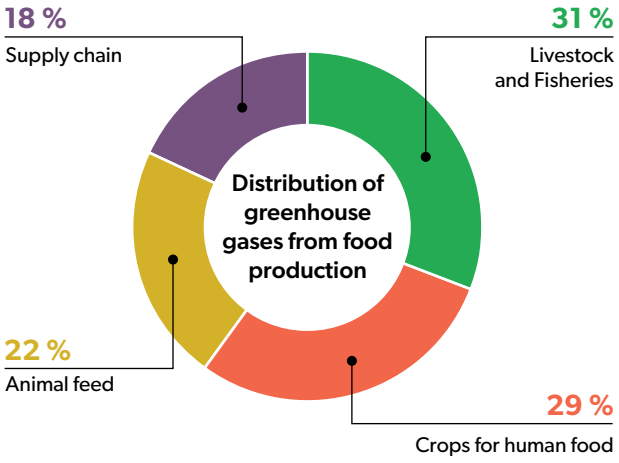


Figure 5: Share of food production in global CO_2 emissions [7];
Figure 6: Distribution of greenhouse gases from food production [7]

Climate change is one of the greatest challenges of the 21st century. As greenhouse gas emissions continue to rise, the climate is warming, leading to more extreme weather events, rising sea levels, and the loss of habitats for both people and animals. Food production plays a significant role in this, as it accounts for about a quarter of global CO_2 emissions. More than half of this is attributed to the production of animal-based products.

A single cow emits around 160 kg of methane per year just through its digestion.

A person who switches to a vegan diet and makes no other changes to their lifestyle can save about 2 tons of CO_2 per year [13]. And if everyone in the world did the same, we could reduce the global food related greenhouse gas emissions by up to 70 percent [14]!

Land Use

Half of the land available for human use is currently used for agriculture. Of this, meat and dairy production alone occupies more than 75 percent of the cultivated area. This amounts to an impressive 37 million km² – as large as all of the Americas, from Alaska in the north to Cape Horn in the south [15]. Animal products provide us with only 18 percent of our calories and, contrary to widespread belief, only 37 percent of our protein [7].

This high land usage for the production of animal products is problematic, as it significantly contributes to deforestation. Often, species-rich rainforests are cleared to create grazing land and fields for animal feed. In 2023, approximately 3.7 million hectares of rainforest were deforested, roughly the size of Baden-Württemberg, the third biggest state in Germany [16]. This deforestation leads to the loss of valuable habitats, drastically reduces biodiversity, and significantly impairs the forests' ability to store CO_2.

Water Usage

Each year, around 2,800 km³ of water is withdrawn for agriculture, which is about 1.7 million swimming pools. Additionally, around 6,400 km³ of rain falls onto the fields. About 41 percent of this water is for producing animal feed [17, 18]. Generally, animal products use more water per kilogram than plant-based products, but these numbers must always be viewed in context. 1,000 litres of water in a dry region has a greater impact on water scarcity than in a rainy, water-rich region. When water-intensive foods like nuts or citrus fruits are grown in dry areas, they can have a higher water footprint than meat. Therefore, it is also important to focus on local products even with plant-based foods [19].

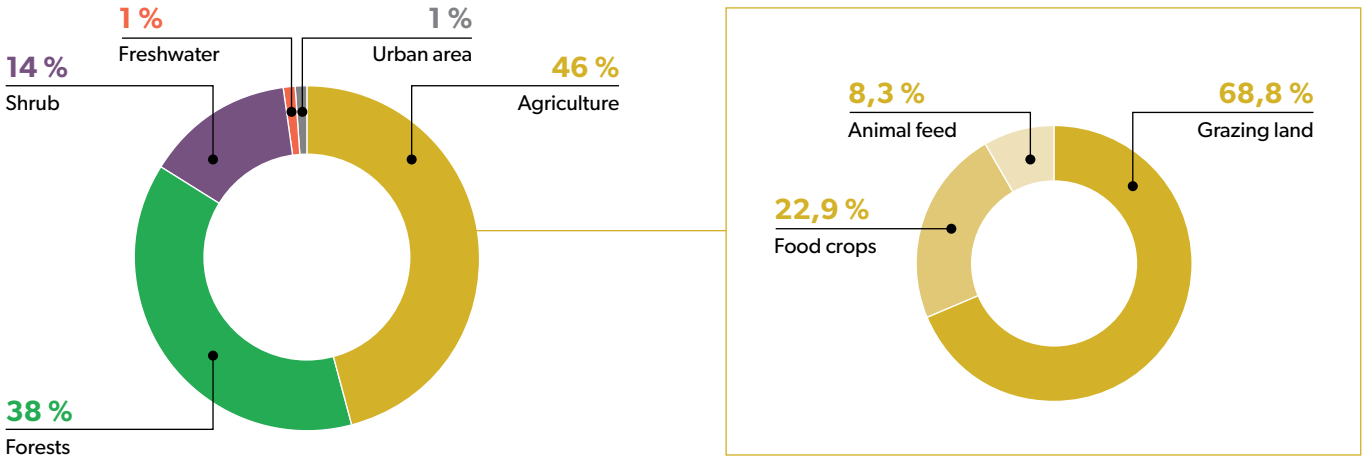


Figure 7: Use of worlds habitable land [15]

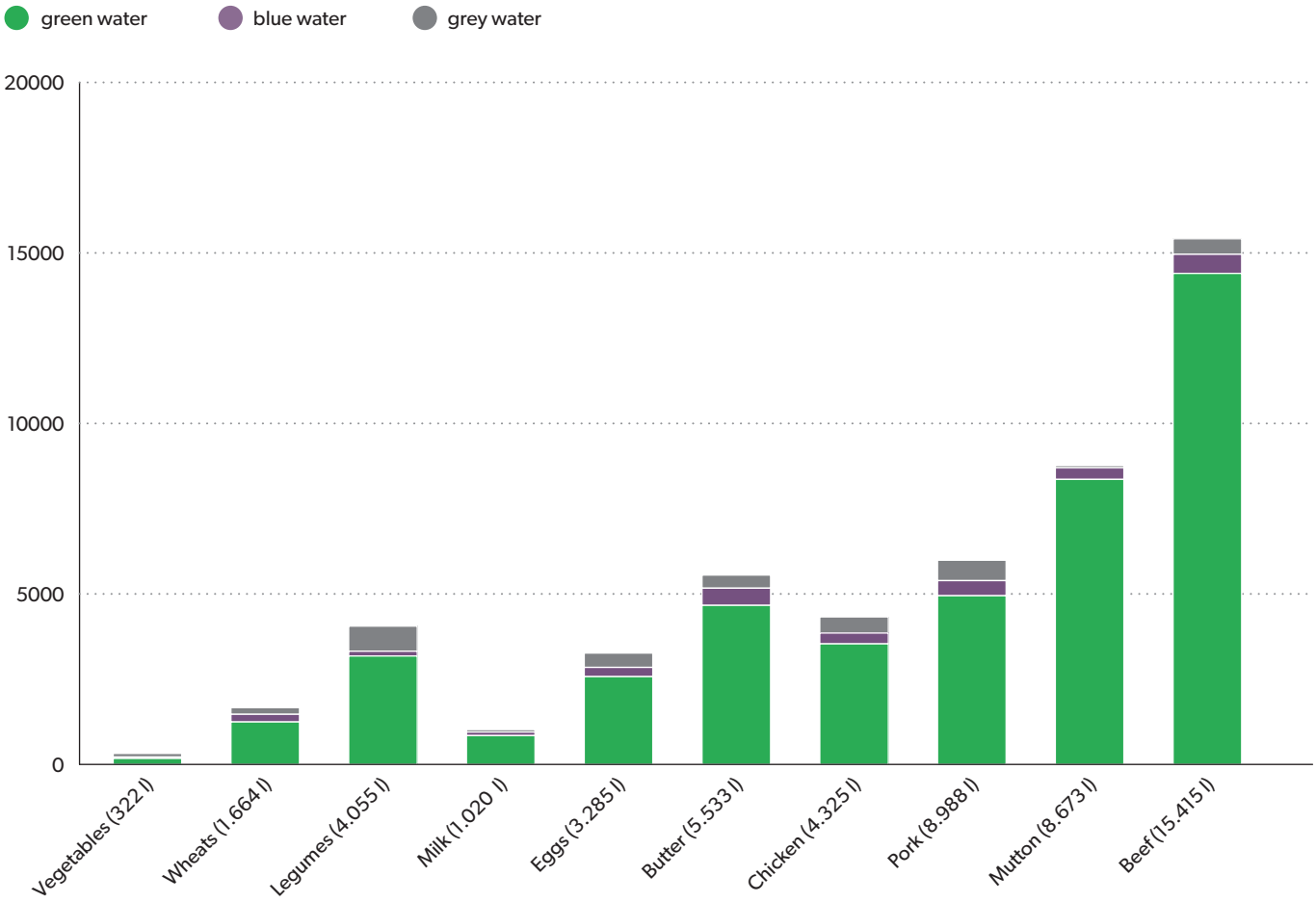


Figure 8: Virtual Water Usage by type of water per kg of product [6]

Virtual water refers to the invisible amount of water needed to produce a product, including all processed resources. Virtual water is therefore an indirect but significant water footprint that reflects the total water consumption in global trade networks. It is made up of green, blue and grey water [20].

Green water is naturally occurring rain and soil water.

Blue water is taken from groundwater and from lakes or rivers for irrigation.

Grey water is water that is polluted by agriculture. As well as the amount of water that would be needed to neutralise the pollution.

of water in meat production is dedicated to cultivating feed crops

Figure 9: Percentage of water use in meat production dedicated to feed crops [20]

Wow, that's a lot of figures – who's supposed to be able to understand all that?

The production of animal-based foods has a really big impact on the environment, and your company recognises this and therefore wants to remove meat from its menu. As the situation is so complex, your boss asks you to write an email to all employees explaining the negative environmental impact of meat consumption and the positive effects of switching to vegan/vegetarian. Describe what you have learnt from the graphics and research further aspects yourself.

ORGANIC VERSUS CONVENTIONAL – WHO WILL WIN THE BATTLE?

The topic of "organic" often leads to heated discussions. Some people want to consume as much organic produce as possible. Others think it's a bad idea. Watch the two short films and collect arguments for organic farming (Team Compost) and for conventional farming (Team Fertiliser). Who do you think will win the battle? You are the jury!

"Modern Agriculture and Fishing" from FuseSchool

"What is Organic Farming?" from TG Campus

pro organic farming

pro conventional farming

Which team do you think is the winner?

You can display automatically generated subtitles in a language of your choice under "Settings" on YouTube.

CHECK YOUR KITCHEN!

1. How many vegan-vegetarian starters, main courses and desserts are there on your menu?

2. What do you notice about the distribution? Is it balanced? Or does one menu area predominate?

3. How are vegetarian and vegan dishes labelled on the menu?

4. How much beef, how much pork and how much poultry does your training company buy each week?

5. Calculate the CO_2 emissions of the meat using the data in the figure.

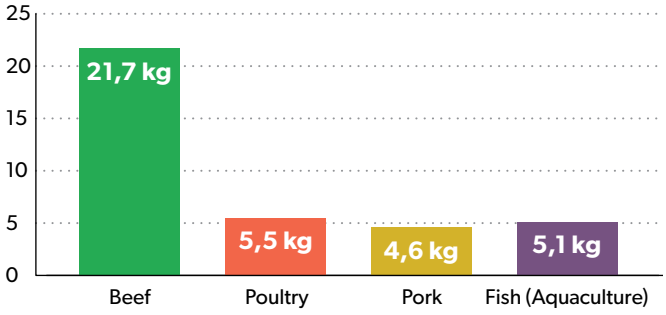


Figure 10: CO_2 equivalents of meat products per kilo [11]

Beef: _____, Poultry meat: _____,

Pork: _____, Fish: _____,

6. Which dairy products (e.g. butter, cheese, cream) do you use? How many kg/ml do you buy per week? How much CO_2 equivalents?

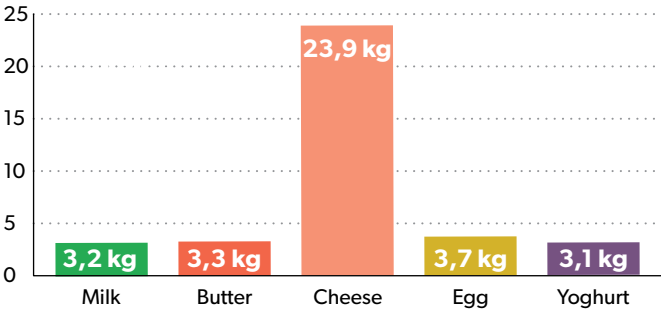


Figure 11: CO_2 equivalents of dairy products per kilo [7, 21]

7. What suggestions do you have for your training company to reduce the negative impact of animal products?

The average annual electricity consumption of a household in Europe is 2–4.000 kg CO_2 equivalents .

ADVERTISE WITH SUSTAINABILITY

Your company wants to become more sustainable and therefore adds more vegan and vegetarian dishes to the menu. Also, meals that were previously served with meat can now also be ordered in meatless versions. In small groups, research why this can contribute to the sustainability of the business. Based on this, create a reel (video 1–1.30min) in which you explain to your company's social media followers why your establishment has decided to add more vegan/vegetarian options and how the dishes taste.

Alternative:
Design a newspaper advert on this page in which you advertise the sustainability of your training company.

Suggestions for adjectives: tasty, healthy, climate-friendly, regional, seasonal, fresh, flavourful, aromatic, hearty, creamy, crispy, spicy, juicy, balanced, delicious, light, wholesome, nutritious, versatile, creative

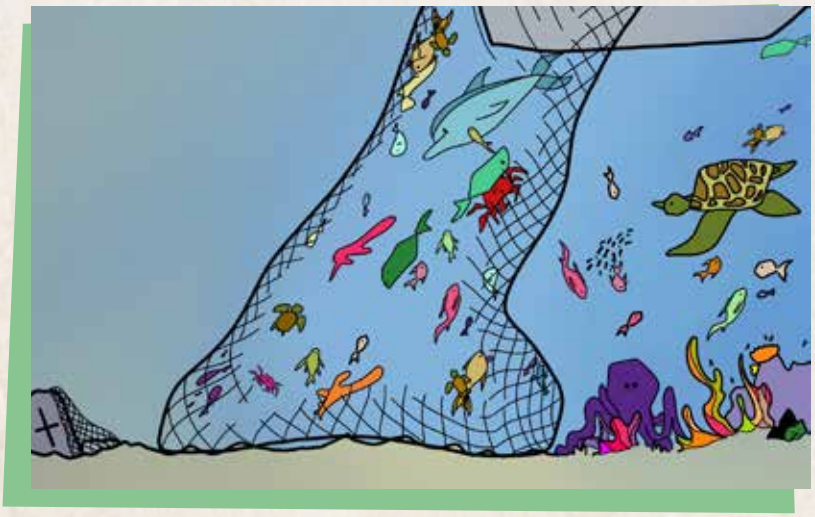
The vegan comic – A taste of truth

Last week Robin started a new job at a vegan-vegetarian restaurant. Sometimes, people accidentally come into the restaurant who have not noticed that there are no animal products on the menu. Today, a person arrives at the restaurant, looking around questioningly after a quick glance at the menu. Robin approaches them and asks if they can be of assistance. A conversation begins.

Animal Welfare

The guest is astonished to learn that in conventional farming, a pig weighing around 50-110 kg has only 0.75 m^2 of space, which affects 99 percent of pigs in the EU. The remaining one percent of pigs in organic farming have 1.3 m^2 of space [22, 23].

Conventional farming is only possible with the intensive preventive use of antibiotics, as the animals live so closely together that diseases spread rapidly. Still one in five pigs dies before the slaughter date due to the conditions [24].

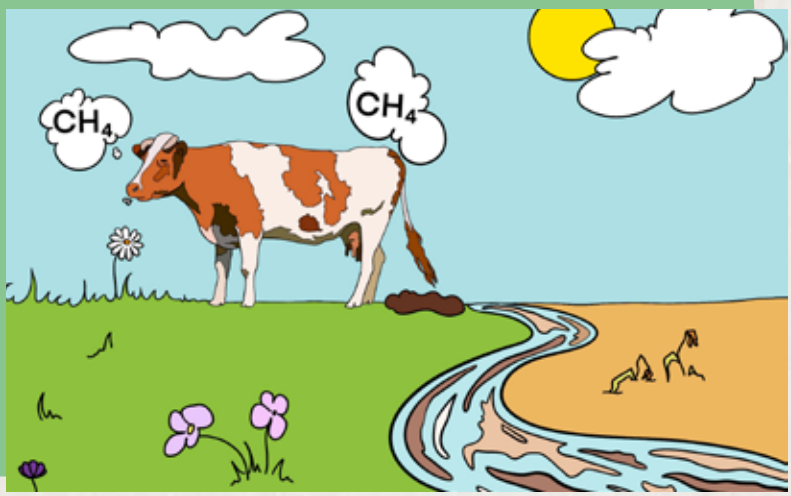


Overfishing

Robin explains that there is no fish on the menu because over 90 percent of the world's commercially exploited fish stocks are considered overfished or maximally exploited. This places an extreme burden on marine biodiversity, as many fish are missing as food sources for other marine animals. It is also concerning that 10 % of all waste in the oceans consists of fishing nets, which in turn leads to more deaths of fish and other marine life [25, 26].

Health Risks

The guest is shocked to learn that the International Agency for Research on Cancer has classified processed meat in the highest risk category. This classification means that processed meat is as harmful as cigarettes and alcohol [27]. In addition to the increased cancer risk, research has also shown a higher mortality risk associated with meat consumption. Eating meat daily increases the likelihood of dying within the next 10 years by 15 percent. Furthermore, there are also links between the consumption of meat products and the development of cardiovascular diseases as well as Type 2 diabetes [28].



Milk Production

Although no animals are killed for dairy products, the negative environmental impacts remain. Cows excrete about 50 kg of manure and urine per day, which contaminates groundwater and allows pathogens to enter the drinking water. This has already led to several thousand cases of illness [29]. Additionally, cows do not just produce milk on their own; they must either be pregnant or have recently given birth. They are impregnated every year and separated from their calves immediately after birth [30].

What are other reasons for serving only plant-based foods? Draw another comic tile!

LOOKING FOR A LABEL

Labels are important for getting a quick overview of the sustainability of an ingredient or food. There are regional labels (e.g. for the European Union or individual countries), there are labels from independent organisations (e.g. the V-Label) and there are labels from companies. As a rule, labels from independent organisations are the strictest and most controlled. You can find out more about labels on the Siegelklarheit website: https://www.siegelklarheit.de/en/

Figure 12: V-Label

V-Label [31]

- The V-Label is an internationally recognised and protected trademark for labelling vegan and vegetarian products.
- No ingredients of animal origin are used at any stage of production, additives and flavourings are also taken into account.
- The controls also extend to substances that do not require labelling, for example apple juice or wine are not clarified with gelatine and sugar is not filtered with bone meal.
- All production steps must be designed in such a way that unintentional traces of non-vegan or non-vegetarian substances in the product are minimised.
- No animal testing has been carried out to produce the product or individual ingredients, additives and other substances used for processing

Figure 13: Vegan Flower Label

Vegan-Flower [32]

- founded by The Vegan Society (GB)
- No animal products, by-products or derivatives may be or have been used in the manufacture and development of the product and its ingredients.
- No animal testing may be carried out in the development and/or manufacture of the product and its ingredients.
- No animal genes or substances derived from animals may have been used in the development and/or production of GMOs (genetically modified organisms).
- All dishes that are to be labelled as vegan must be prepared separately from non-vegan dishes.

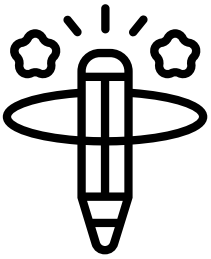
Figure 14: EU organic Label

EU organic logo [33]

- Founded by the EU (European Union) in 2010.
- All packaged organic food produced within the EU must be labelled.
- Non-packaged organic food produced within the EU can be labelled.
- Imported organic food into the EU can also be labelled.
- 95 percent of the ingredients must be organic.
- free from genetic engineering
- It guarantees more species-appropriate animal farming, absence of organic synthetic pesticides and synthetic chemical fertilisers.
- A code provides information about the origin and the latest review of the product.

Check your kitchen! Which products in your store and fridge carry these labels?

IS A VEGAN WORLD POSSIBLE?



Eating habits change over time. For example, overall meat consumption in Europe has nearly doubled in the last 50 years [34]. Ask your parents or grandparents what they regularly ate at your age.

_____

_____

As you have already learned, consuming meat is not sustainable, and if we do not change our eating habits, we will not be able to stop climate change. However, changing habits is difficult, but if we do not, we endanger the lives of future generations. So how can we change this habit and promote a vegan and vegetarian lifestyle?

To answer this question, we first need to look at the status quo and analyse why people eat so much meat. Read the following questions and write down your thoughts:

Why do you eat meat?

_____

Why do your friends/colleagues eat meat?

_____

What would make you eat less meat?

_____

What are the obstacles to a vegan-vegetarian lifestyle?

_____

Now we need to think outside the box:
Imagine a world where a non-lethal virus has infected all animals. The effect of this virus is that all animal products now taste unbearable. It harms neither the animals nor the humans, but the taste cannot be changed. Also, all other animal products like wool and leather are now useless. So, the whole world goes vegan.

Imagine what it would be like to live and work in this world and complete the sentences:

Since all animal products are unusable, our menu mostly consists of _____ and _____.
For breakfast, we now serve _____, which is especially popular with our guests because _____.
Instead of cheese and meat, we now use _____ and _____ to add flavour to our dishes.
In schools and workplaces, cafeterias offer a variety of menus that primarily include _____ and _____.
We had to adapt to the new ingredients and have now developed a passion for _____ and _____.
The atmosphere in the kitchen has changed because _____ and _____ now make up most of our dishes.
Our restaurant has become known for its creative vegan alternatives such as _____ and _____.

What would it be like to live and work in this world?

_____

_____

That doesn't sound so bad! The question now is: How can we move one step closer to this vision from our current situation? What needs to happen? Gather ideas and write down what different actors could contribute to a vegan world.

The Government

Civil Society

Your Company

Yourself

Choose one of the action options for your company and think concretely about how this change can be implemented. Create an action plan for it.

What is the biggest problem?

What is the most important goal?

Who is responsible?

Who can you collaborate with?

Action Plan:

1. Step

2. Step

Listen to Kernvoll about the challenges for a vegan business:

Listen to the interview

Read the script

Myth Buster

1 Myth – Vegan diets cannot meet nutritional needs. FALSE

With a vegan diet, the entire nutritional needs of the body can be met. As in any other diet, attention must be paid to finding a balance, for example, proteins, iron and calcium are found in high proportions in meat products, but also in nuts or legumes. Only vitamin B12 cannot be obtained from plant-based foods, but this substance is added to many meat and milk alternatives [35].

2 Myth – With vegan nutrition athletic peak performance is not possible. FALSE

Many top athletes follow a vegan diet and get their protein from plant-based foods. For example, boxing world champion Ünsal Arik, European champion in the super welterweight category, or Luisa Schulze, a professional handball player in the German Bundesliga, and Venus Williams, a professional tennis player and Wimbledon winner. Even Arnold Schwarzenegger is now a vegan.

3 Myth – Vegan doesn't taste good. FALSE

The notion that vegan food lacks taste is a misconception that doesn't hold up against the vibrant reality of plant-based cuisine. The wide array of flavours, culinary creativity, and global diversity in vegan recipes showcase that plant-based dishes can be delicious and satisfying. Chefs and home cooks worldwide are continually innovating, using a variety of herbs, spices, and innovative ingredients to create mouthwatering meals. Since reopening after the COVID-19 pandemic, the Eleven Madison Park restaurant in New York has switched to a completely vegan menu and received three Michelin stars [36].

4 Myth – Vegan is Expensive. FALSE

Basic plant-based foods like beans, rice, lentils, oats, fruits, and vegetables are often cheaper than meat and dairy products. If you don't rely solely on vegan substitutes and cook fresh, a vegan diet can be very budget-friendly!

5 Myth – As humans, we are omnivores and hunters. Eating meat is in our genes. FALSE

The idea that humans are omnivores and hunters due to genetic predisposition can be questioned on various levels. Biological features such as flat molars and a digestive system more suited to plant-based diets suggest a closer affinity with herbivores. Additionally, dietary habits vary culturally and geographically, many societies have successfully thrived on plant-based diets. In summary, a comprehensive examination of biology, evolution, nutrition, and ethics indicates that the assumption of humans being genetically predisposed meat-eaters is not fully supported. A plant-based diet can align with our biology and promote both individual and environmental well-being [37].

Hear Kernvoll about developing nutritional meals for athletes:

Listen to the interview

Read the script

ANOUK'S JOURNEY THROUGH THE WORLD OF NUTRIENTS

This is Anouk. Anouk is a chef in a restaurant that advertises itself as serving balanced and healthy meals. The restaurant has a new owner who wants to change the entire menu to vegan and still offer nutritional meals. Most of the regulars do not believe that this will work, and Anouk also has her doubts. She is therefore given the task of gathering information and creating an overview for the guests on how they can fulfil their dietary requirements with a vegan diet.

So Anouk does some research and learns that vegetarian food has a low energy density on average. But what does that mean?

The energy that a person consumes is made up of the basal metabolic rate, in other words the energy required to maintain bodily functions, and the power metabolic rate, which is the energy that goes beyond the basal metabolic rate, for example through sport, work or breastfeeding. The basal metabolic rate corresponds to around 1 kcal per hour and kg of body weight. However, it varies with factors such as gender or age.

Anouk uses a calorie calculator and finds out that she needs about 2000 kcal per day. Anouk also learns that you shouldn't just eat 2000 kcal of anything. According to the reference values for a healthy diet, you need to get about half of your energy from carbohydrates and 30 per cent from fats. You also need 48 g of protein per day and lots of vitamins and minerals. Where is all this supposed to come from in a vegan diet?

Too much text? Just listen to it!

Carbohydrates

Anouk has nothing to worry about in this area. Carbohydrates are mainly found in plant-based foods such as grains and pulses. As vegetarians and vegans often eat more plant-based foods than omnivores, they are often even higher than the 50 percent guideline. For a healthy diet, it is also best to eat fibre-rich carbohydrates, such as wholemeal products or pulses.

Too much text? Just listen to it!

Which plant-based sources of carbohydrates do you know?

Fats

Anouk learns that not all fats are the same. You should mainly consume unsaturated fats and only a small amount of saturated fats. Many people in Europe exceed the guidelines for fat intake, but vegetarians and vegans do not. This is because animal products contain significantly more fat than plant-based products and almost exclusively unhealthy, saturated fats. Too much fat is harmful to health and can lead to cardiovascular disease in the long term. Anouk won't have to worry about that in the future. But where does she get the fat she needs?

Too much text? Just listen to it!

Research vegetable fat sources and pay attention not only to the quantity, but also to the quality of the fat.

Proteins

Anouk looks at the topic of protein. Compared to diets containing meat and dairy, vegan diets tend to provide less protein. The recommended amount is 0.8 g of protein per kilogramme of body weight, a value that many meat eaters exceed, while most vegans fall short of this. Protein is crucial for building muscle, which is particularly important for the fitness-conscious guests at Anouk's restaurant. But not all proteins are the same. Proteins are made up of different amino acids, nine of which are considered essential. Anouk knows that the bioavailability of proteins from plant sources is not as high as that of proteins from animal sources. It is also exciting that preparation, especially cooking, can improve the absorption of proteins.

In view of the lower protein quality in vegan food, Anouk is wondering how she can ensure that her vegan dishes contain enough high-quality protein. Which plant-based sources are particularly rich in protein and how can the protein quality be improved? Do some research and develop a vegan fitness meal that is rich in protein.

Too much text? Just listen to it!

Vitamins

Anouk discovers that plant-based foods are the main source of vitamins. Vegans and vegetarians can often meet their vitamin requirements better than meat-eaters. However, the vitamin content of plant-based products varies depending on location, climate and plant species. The storage, processing and preparation of food also have a significant influence on the bioavailability of vitamins. For example, many vitamins are lost through cooking.

Too much text? Just listen to it!

However, some vitamins are particularly important in a vegan/vegetarian diet. Vitamin D, for example, is often a challenge, not only for vegans but also for people on a mixed diet. It is mainly absorbed through the skin and is found in a few animal foods such as fish and shellfish. However, most people do not reach the recommended levels without supplements.

Vegans should also pay attention to vitamin B2, which is traditionally found mainly in dairy products. Good plant-based sources are pulses, nuts and oilseeds such as rapeseed or sunflower seeds. Above all, attention must be paid to the vitamin B12 balance, as this does not occur naturally in plant foods. It is only found in very small amounts in fermented foods such as kimchi or sauerkraut. For a balanced diet, vegans should take B12 supplements, which is why many vegan substitute products are now fortified with this vitamin.

Anouk doesn't want a vitamin deficiency either, so she goes out for a short time to top up on vitamin D in the sun. Maybe do the same?

Minerals

Anouk continues her journey of discovery and is now focussing on vital minerals. These include metals such as iron, magnesium, calcium and non-metallic elements such as calcium and potassium. Interestingly, minerals are found in animal and plant foods as well as in drinking water. In principle, most people are within the reference amounts in terms of minerals.

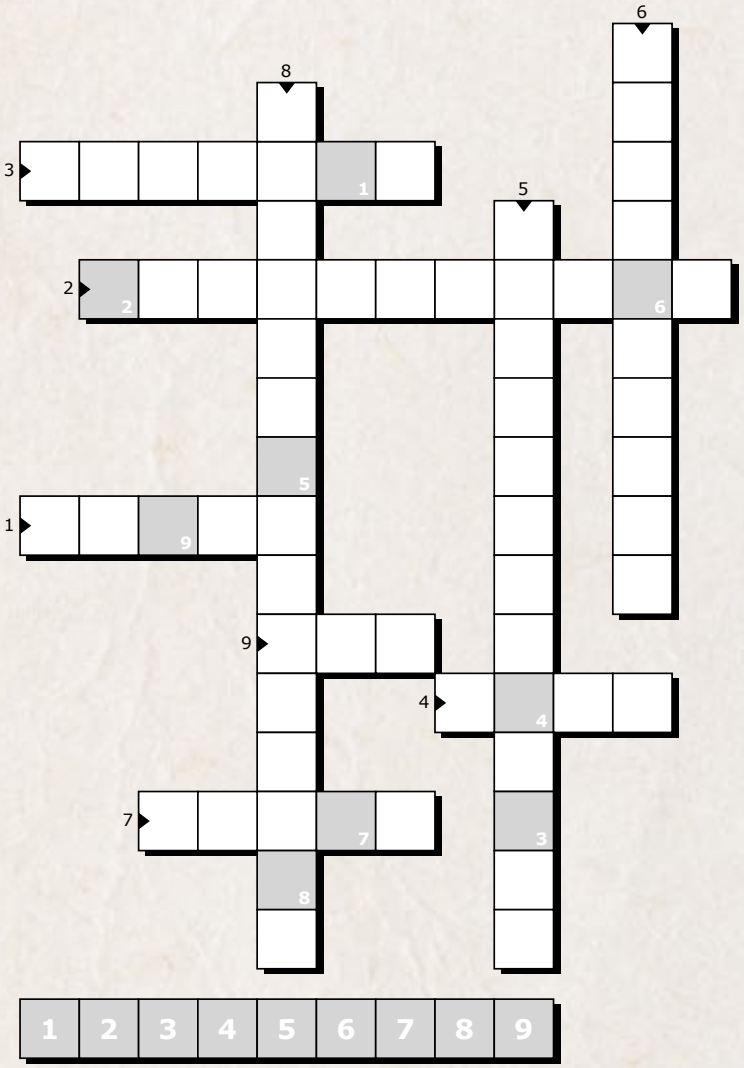
Too much text? Just listen to it!

However, there are some critical aspects of a vegan or vegetarian diet. For example, iron deficiency is very common worldwide. Iron plays a crucial role in the transport of oxygen in the body. Unfortunately, the iron found in plant-based foods cannot be absorbed as efficiently as that found in animal products. Like spinach – although it's high in iron, it can be poorly absorbed by the body, despite Popeye's fondness for it!

The question for Anouk is: Which plant-based foods are rich in iron? Research other plant-based sources of iron and consider how Anouk can ensure she's getting enough. Tip: The combination of ingredients is key.

A vegan diet is also possible in different phases of life. Care must be taken and vitamin B12 supplemented, especially during breastfeeding and pregnancy. However, children, adolescents and older people can live a vegan life without any problems with a balanced diet [35].

Now use Anouk's research to fill out this crossword puzzle!



1. The energy a person consumes is made up of the power metabolic rate and the _____ metabolic rate.
2. Which type of fats should Anouk mainly consume?
3. What is one factor that can improve the absorption of proteins from plant sources?
4. What is a common mineral deficiency worldwide that is particularly relevant to vegans?
5. Half of the calorie intake should come from _____.
6. What kind of Carbohydrates are better for a healthy diet?
7. Proteins are made up of different _____ acids.
8. What factor is important for the absorption of proteins by the body?
9. Which vitamin needs to be supplemented in a vegan diet?

Erstellt mit XWords – dem kostenlosen Online-Kreuzworträtsel-Generator: https://www.xwords-generator.de/de

Glossary

Reference values: Reference values for nutrient intake are based on the fact that individual nutrient requirements are difficult to measure and depend on various factors such as age, gender, activity level, stress, illness and others. These reference values are based on the average requirement of the population and include safety margins to take account of fluctuating requirements. The reference values of the German Nutrition Society can be found in this workbook [35].

Fibre: Dietary fibres are components in plant foods that cannot be completely broken down by our gastrointestinal tract. As a result, they promote a feeling of fullness and stimulate the gastrointestinal tract [35].

Amino acids: Amino acids are the building blocks of proteins and essential molecules for building and maintaining tissues in the body. There are several hundred amino acids, although only 21 are used by the human body to build proteins [35].

Bioavailability: The bioavailability of proteins refers to the amount of protein that can actually be absorbed and utilised by the body. It takes into account factors such as the digestibility of the protein as well as the presence of other nutrients or substances that may affect absorption [35].

PLANETARY HEALTH DIET – HEALTHY FOR PEOPLE AND THE PLANET

As we have seen, the way we eat not only has a significant impact on our own health, but also on the health of the planet. Researchers have therefore developed a diet plan called the Planetary Health Diet (PHD) that aims to protect both human and planetary health. Interestingly, the PHD includes small amounts of animal-based foods, but they are optional and can be replaced by plant-based foods. The proportions of this plan are based on how many calories you should consume daily.

Watch this information video about the PHD

Find some recipe inspirations here:

Now for your task: Develop a vegetarian and a vegan recipe that follows the PHD guidelines! Watch the video first for an explanation of the PHD. You can look for inspiration on the website behind the QR-Code.

Food Group	Intake in grams per day (possible range)
Whole grains	232
Starchy vegetables	50 (0 – 100)
All vegetables	300 (200 – 600)
All fruits	200 (100 – 300)
Dairy foods	250 (0 – 500)
Legumes (plant Protein)	75 (0 – 100)
Nuts (Plant Protein)	50 (0 – 75)
Unsaturated oils	40 (20 – 80)
Saturated oils	11,8 (0 – 11,8)
Added sugars	31 (0 – 31)

Figure 15: The Global Health diet: this graphic was prepared by EAT and is included in an adapted summary of the Commission Food in The Anthropocene: the EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems. The entire Commission can be found online at eatforum.org/eat-lancet-commission [38]

CLIMATE-FRIENDLY DIET: WHAT CAN YOU DO?

What can chefs and other food service professionals contribute to a sustainable dietary change? We have collected some tips [39].

Changing culture by changing the menu
Chefs can make healthy and sustainable food tasty by using their unique knowledge, skills and creativity to develop innovation in catering. This is vital to take the public on a journey of discovery and inspire them to eat healthily.

Emphasise the benefits of changing your diet
Eating healthy foods from sustainable sources is only partly about reducing your consumption of certain foods. Emphasise eating more of the healthy options rather than just focusing on reducing the consumption of unhealthy foods.

Discover new foods and vary your diet
Focus on the variety of new flavours, ingredients and menu options that a sustainable diet opens up by embarking on a lifelong journey of discovery. Promise yourself to regularly add new ingredients to your menu to keep things innovative and exciting.

Use messages around flavour
Use culinary techniques and select the tastiest ingredients to ensure that healthy and sustainable options are as tasty as or even tastier than the alternatives.

Collaborate with suppliers and consumers
Whether you are managing a cafeteria or running a school programme in Burkina Faso, as a food supply professional you can increase the demand for organic healthy food by working with suppliers and consumers. Tell the farmers' story on menus and in marketing materials to emphasise their contribution to the environment and sustainability.

Focus on quality and quantity
Use culinary strategies to promote satiety and enjoyment of food without encouraging overconsumption. Use smaller plates and avoid trays in the canteen to reduce food waste. Plan and portion carefully to utilise the whole product and avoid waste.

Hear Kernvoll for tips for future chefs:

Listen to the interview

Read the script

GO ONLINE!

Do you sometimes lose your way when it comes to vegan-vegetarian food? No problem, because you're not alone!

There are lots of offers and people on the internet to support you. Here we present some of them. Which ones do you already know?

Figure 16 Happy Cow Logo

Happy Cow has a lot to offer. You can use the website (https://www.happycow.net) or download the free app. Do some research: What does Happy Cow offer?

Do you already know the great vegan-vegetarian recipes from the Rebel Recipes website? Which of the dishes would go particularly well on your menu?

Have you ever had a look at Fitgreenmind? If not, you've definitely missed out! Maya Leinenbach is a vegan food blogger and posts creative and delicious vegan cooking hacks on YouTube, Instagram and Pinterest.

Figure 17: Video Thumbnail from Fitgreenmind

Do you know any other vegan-vegetarian influencers? Research three more!

VEGAN VIPS

Figure 18: Natalie Portman (by Gage Skidmore)

Natalie Portman

Israeli-American actress, director and film producer. Known from: Leon the Professional, Star Wars (I-III), Thor, V for Vendetta

"Only after I became active in women's issues did I realise that my veganism was related to those very issues. Dairy and eggs don't just come from cows and chickens, they come from female cows and female chickens. We're exploiting female bodies and abusing the magic of female animals to create eggs and milk [40]."

Figure 19: Billie Eilish (by Raph_PH)

Billie Eilish

US-american Singer-Songwriter

"By replacing meat consumption with plant-based foods, together we can give the earth a fighting chance.[41]"

Figure 20: Patrik Baboumian PETA Advertisment – (by Caroline Pitzke)

Patrik Baboumian

Armenian weightlifter and strongman. Germany's strongest man (2011)

"The strongest animals are herbivores: gorillas, buffaloes, elephants and me [42]"

Figure 21: Venus Williams (by Tatiana)

Venus Williams

One of the most successful female tennis players of all time. She has won seven Grand Slam singles titles, including five Wimbledon titles.

" I try to make the majority of my meals raw and vegan, but I'm only human and am known to cheat a little bit. I joke that I'm a 'chegan' because sometimes I've been known to stray.[43]"

PRO – CON VEGAN-VEGETARIAN DIET

In the previous pages you learnt a lot about different diets and their impact on the world. If you would open a restaurant, would it be plant-based or would you still serve animal products? Please support your answer with pro and con arguments in the list below. Research online for additional arguments.

My restaurant would be called _____ and serves

_____.

Pro plant-based	Contra plant-based

Hear from the German Vegan-Catering company Kernvoll about their reasons for going vegan:

Listen to the interview

Read the script

MAKE YOUR OWN MILK ALTERNATIVE!

Preparation time	Preparation difficulty level	Portions
10 Minutes		(1 Litre)

Amount	Ingredients	Preparation
100 g 100 g 1 pinch	Coarse organic oats Ice cubes or crushed salt	Put in a blender. The ice prevents a slimy consistency.
1	Soft date	Is added. Alternatively use a tablespoon of agave or maple syrup.
900 ml	Cold water	Is added to the mix. Then blend everything on the highest setting for 1 minute.
		Strain the mix through a fine meshed sieve. Then push it through a straining cloth. The oat drink can be kept in the fridge for three days. Shake it well before each use.

Check out the recipe video:

FACT SHEET

RICE DRINK

Flavour
Slightly sweet and nutty flavour, comparable to cow's milk.

Consistency
Thinner than cow's milk.

Use in the kitchen
- Perfect for cereal, coffee and desserts such as cakes and biscuits.
- Its light texture makes it suitable for soups and light sauces.
- Is very thin, add a thickener such as flour or cornflour if required.
- Use rice drink in recipes that complement its sweet nutty flavour.

Origin
The largest cultivation areas today are in China, India and South-east Asia. However, rice also grows in Italy, Spain, France, the USA, South America and Australia.

Sustainability
To keep pests and weeds at bay, rice is usually grown in wet cultivation, so the plant stands in water. This has several negative consequences: Wet cultivation requires a lot of water (2,000 to 5,000 litres per kilogram of rice harvested). Due to decomposition processes in the root, the plant produces methane, which is even more harmful to the climate than CO_2. Rice cultivation releases around ten per cent of the methane produced by humans worldwide. In comparison, livestock farming contributes to 30 per cent of global methane emissions. Conventional cultivation also uses fertilisers and pesticides that pollute the environment. In dry farming, pests and weeds have to be controlled mechanically or with pesticides and herbicides. On the other hand, dry farming requires less water and produces less methane. After the rice has been harvested by hand, it has to travel a long way to reach us, depending on its origin [44–46].

How many sustainability stars do you give rice drink? Colour in!

Nutrients
Rice drink is characterised by its high carbohydrate content, which makes it a high-calorie option among plant-based drinks. Compared to other milk alternatives, rice drink contains little protein and fat. Rice drink usually contains only small amounts of essential vitamins and minerals, even if it is fortified [47].

Figure 22: Rice Cultivation – Dominik Kassel/pixelio.de

→ TIP
Choose a rice drink with an organic label – this ensures that no artificial fertilisers are used and that biodiversity is not endangered by pesticides and herbicides.

Choose fair-certified products – this ensures that the workers are paid fairly and have good working conditions.

Choose regional products from dry farming to avoid further transport and reduce methane.

Too much text? Just listen to it!

FACT SHEET

OAT DRINK

Figure 23: Oat – Grace Winter/pixelio.de

Flavour
Slightly sweet and mild, comparable to low-fat or fat-free cow's milk.

Consistency
Thicker than cow's milk.

Use in the kitchen
- A creamy and tasty favourite in the world of plant-based dairy products.
- Versatile in sweet and savoury dishes.
- Ideal for cream soups, curries and baked goods such as cakes and biscuits.
- As a cream substitute in the form of oat cuisine

Origin
Worldwide

Sustainability
Oats are a robust grain that requires little water, pesticides and fertilisers. It also grows in Europe and therefore does not have to travel far to reach us [48, 49].

Sometimes artificial sweeteners or artificial phosphates are added. These additives are not subject to labelling (except for organic products, where they are not permitted).

Oats belong to the grass family and are gluten-free. However, the same machines are usually used for harvesting as for wheat, which means that oats are often contaminated. To avoid allergic reactions, only products explicitly labelled as gluten-free should be used.

How many sustainability stars do you give oat milk? Colour in!

Nutrients
Oat-based drinks tend to have lower nutritional values compared to other plant-based alternatives. In terms of protein content, they fall well behind with very low average protein values. The fat content of oat drinks is also relatively low compared to cow's milk. The carbohydrate content is moderate [47].

→ TIP
Choose an oat drink with an organic label from Europe – this ensures that no artificial fertilisers are used and that biodiversity is not endangered by pesticides and herbicides. And less climate-damaging CO_2 is produced during transport.

Too much text? Just listen to it!

Tip for all plant-based milk alternatives: Shake well before use, as a sediment often forms at the bottom

FACT SHEET

SOYA DRINK

Flavour
Neutral

Consistency
Similar consistency to cow's milk.

Use in the kitchen
- Due to its similar consistency, protein and fat content, soya drink is particularly consumer-friendly and can even be used in difficult recipes such as puddings.
- Stable at high temperatures, ideal for savoury dishes and sauces.
- Care should be taken when using sweetened soya drink, as the sugar content in the rest of the recipe may need to be adjusted, so use unsweetened soya milk in savoury dishes
- As a cream substitute in the form of soya cuisine.

Origin
Mainly Brazil and USA, but also Europe and other countries

Sustainability
In Brazil and the USA, genetically modified soya plants are mainly grown in large monocultures and later used as animal feed. Known problems here are: Deforestation of the rainforest, loss of biodiversity, and the displacement of indigenous populations. However, this does not apply to our soya milk (or tofu). The soya milk we can buy here comes almost entirely from European farmers. The use of genetically engineered plants is (still) prohibited here. Soya drink is made from the leftovers of soya oil production. Caution: Soya can cause allergic reactions [50, 51].

How many sustainability stars do you give soya drink? Colour in!

Nutrients
Soya drink is characterised by its high protein content and outperforms other plant-based drinks in this respect. It also provides significant amounts of various vitamins and minerals, including vitamins B1, B2, B6, folic acid, vitamin E and K1, as well as minerals such as phosphorus, potassium and calcium. In addition, soya drink is often fortified with vitamins B12, D2 and calcium, which further improves its nutritional profile. This makes soya drink a popular choice for anyone looking for a plant-based alternative with a robust nutritional content similar to dairy [47].

Figure 24: Soya Beans – jcesar2015/ Pixabay.com

→ TIP
Choose a soy drink with an organic label from Europe – this ensures that no artificial fertilisers are used and that biodiversity is not endangered by pesticides and herbicides. And less climate-damaging CO_2 is produced during transport.

Too much text? Just listen to it!

Soya drink is an all-rounder: when in doubt, always use soya drink

FACT SHEET

ALMOND DRINK

Figure 25: Almond – dietermann/pixelio.de

Flavour
Slightly sweet, nutty and creamy.

Consistency
Thinner than cow's milk, some brands tend to be a little watery.

Use in the kitchen
- Versatile use for sweet and savoury dishes.
- Its sweet flavour makes it a good substitute for cow's milk in desserts and baked goods.
- Due to its thin consistency, almond drink is particularly suitable for recipes such as muffins and bread.

Origin
Almond trees grow wild in south-west Asia, where they probably originated; they grow well in countries with a Mediterranean climate, for example the USA (California), Australia, Spain and Turkey.

Sustainability
Today, almonds from conventional agriculture are grown in large monocultures in warm countries where the trees need a lot of water. Studies have shown that an average of 371 litres of water is needed to produce one litre of almond milk. In the USA, migrant beekeepers travel from plantation to plantation on a massive scale to pollinate the flowers. Transport stress, pesticides, a monotonous diet – all this weakens the bees' immune system, which leads to higher bee mortality. Caution: Some people are allergic to almonds [44, 50].

How many sustainability stars do you give almond drink? Colour in!

Nutrients
Almond drink offers a balanced nutritional profile with a moderate protein and fat content. Compared to cow's milk, almond drink usually contains lower amounts of vitamins and minerals, but one of the notable benefits of almond drink is its vitamin B12 and D2 content, which are usually added through fortification. This fortification helps to increase the nutritional value of the almond drink, making it more comparable to milk in terms of these important vitamins [47].

→ TIP
Choose an almond drink with an organic label – this ensures that no artificial fertilisers are used and that biodiversity is not endangered by pesticides and herbicides.

Too much text? Just listen to it!

FACT SHEET

COCONUT DRINK

Flavour
Rich and intense, with a strong coconut note.

Consistency
Very thick

Use in the kitchen
- Ideal for soups, stews and sauces, as the consistency is very thick.
- Excellent for creamy dishes and for preparing puddings.
- Coconut drink gives dishes a distinct coconut flavour.
- Due to its high saturated fat content, coconut drink increases the calories in a dish.

Origin
Tropical countries in Africa, South America and Asia, for example Indonesia

Sustainability
The coconut palm needs plenty of water, warmth, light and time to grow. Due to the increased global demand for coconuts, monocultures in which fertilisers are used to accelerate growth are on the increase. A fully grown coconut palm bears around 30 to 40 fruits per year. They are usually harvested by hand: To do this, workers climb up the trunk, which is around 30 metres high. Sometimes long poles fitted with blades are used from below to cut off the fruit. Harvesting machines are also sometimes used. The animal rights organisation PETA has made it public that specially trained monkeys are also used on some large plantations in Thailand. However, most coconuts are grown by small family farms and harvested by hand (around 90 per cent) [52, 53].

How many sustainability stars do you give coconut drink? Colour in!

Nutrients
Coconut drink has a low average protein content, which makes it one of the less protein-rich options among plant-based milk alternatives. On the other hand, it has a fairly high fat content, although this is lower than that of whole milk. The vitamin and mineral content is generally low. However, it does contain some important nutrients, including calcium, magnesium and potassium [47].

Figure 26: Coconut palm – Astrid Götze-Happe/pixelio.de

→ TIP
Choose coconut drink with an organic label – this ensures that no artificial fertilisers are used and that biodiversity is not endangered by pesticides and herbicides.

Choose fair-certified products – this ensures that the workers are paid fairly and have good working conditions.

Too much text? Just listen to it!

Coconuts are not actually nuts, but stone fruits of the coconut palm.

Research the factsheets:
Which milk alternative can cause allergic reactions? Fill in the table. A "yes" stands for "yes, allergen", an "x" stands for "no, no problem".

Allergens	Rice	Oat	Soy	Almond	Coconut
Lactose					
Nuts					
Gluten					
Soy					

Overview of the nutrients per serving (240ml) in milk alternatives compared to milk [54]

	Rice	Oat	Soy	Almond	Coconut	Whole Milk
Energy in kcal	500	542	415	250	334	621
Protein in g	4	17	29	4	4	32
Total lipid (fat) in g	10	10	17	10	21	33
Carbohydrate in g	96	100	33	33	29	53
Fibre in g	0	8	6	4	0	0
Sugar in g	40	79	25	30	25	51
Calcium in mg	83	1.460	1.877	1.876	1.877	1.150
Iron in mg	1	3	5	3	3	0
Vitamin D in IE	0	626	751	626	626	517

Overview of the CO_2 emissions (footprint) of milk alternatives compared to milk

	Rice	Oat	Soy	Almond	Coconut	Whole Milk
CO_2-Equivalents per Litre	1,4	0,5	0,9	7	3,3	3,7 kg[1]

How much do milk alternatives cost? Research current prices per litre online and compare.

	Rice	Oat	Soy	Almond	Coconut	Whole Milk
Price per Litre						

1 This figure differs from the values earlier in the magazine as it concerns whole milk

RECIPE: MAYONNAISE AND POTATO SALAD

Preparation time	Preparation difficulty level	Portions
45 Minutes		

Amount	Ingredients	Preparation
1 kg 200 ml	Waxy potatoes Water Salt	Potatoes are pealed and put in a pot. Water and salt is added and boiled at a high temperature without removing the lid. Then simmer over low heat for 20 minutes.
100 ml ½ tsp ¼ tsp	Soy drink Mustard salt	Are added into a blender and blended on a high setting.
220 ml	Refined rapeseed oil	Is slowly added into the running mixer.
1/2 tsp	Lemon juice or apple vinegar	Is added to the mayonnaise and stirred in.
2 – 3 150 g	Onions Pickled cucumbers	Are chopped into small cubes.
180 ml	Vegetable stock	Is heated up and poured over the onions.
1 tbsp 2 tbsp	Mustard White wine vinegar (or apple cider vinegar)	Is stirred into the stock.
		The potatoes are cut in half and chopped into slides. Add the dressing and let it rest for 10 minutes.
	Salt Pepper	Stir in the mayonnaise and season to taste.

Check out the recipe video:

VEGAN TOUR DE BERLIN

We, Tom and Silvana will show you the best of vegan Berlin.

top to bottom:
Figure 27: Memorial Church at Ku'Damm,
Figure 28: Fair and Vegan Shopping,
Figure 29: Berlin TV-Tower

Figure 30: Breakfast in Kreuzberg

Figure 31: Vegan Pfannkuchen

Figure 32: Enjoying a Pfannkuchen

Figure 33: Vegan Indian Dishes

The tour starts at Südstern underground station with a hearty vegan breakfast. Tom likes to eat Menemem, a Turkish breakfast food with salad and Silvana enjoys a vegetable omelette with salad.

Well-fuelled, the sightseeing can begin: the two of us take the underground to Alexanderplatz to marvel at the TV tower. There are also lots of exciting vegan things to discover in the neighbourhood. You can not only enjoy delicious vegan food but also shop for stylish vegan fashion.

After that it's time for something sweet, so we take a walk up Rosenthaler Straße and have delicious vegan donuts and Pfannkuchen. Silvana enjoys a "Raspberry Bomb" and Tom the "Blueberry Cheesecake" Pfannkuchen. If you fancy vegan donuts, Berlin is the perfect place to satisfy your sweet tooth.

Then it's on to the next highlight: We take the underground to Ku'Damm. It's a really good place for a stroll. If you're feeling hungry for a snack, you can choose from one of the many shops. There is a huge selection of vegan-vegetarian cuisine, including vegan burgers, tarte flambée, curries, dumplings, wraps, ramen,

left to right:
Figure 34: Pumping water,
Figure 35: Vegan Store in Neukölln,
Figure 36: Selection of nuts and dried fruit,
Figure 37: Vegan Currywurst

bowls and bao buns. The food is best enjoyed with a view of the Kaiser Wilhelm Memorial Church, which was destroyed in the Second World War.

After a stroll, we continue on to Neukölln. Here you can find an extensive range of vegan foods, cosmetics, pet food, household products and sweets. Some stores have a special focus on products from collectives and small manufacturers. We go for refreshing lemonades.

From there, we go for a walk in the Bohemian Village, one of the oldest parts of Berlin in the centre of Neukölln. Here we have a quick refreshment thanks to the water pump. On the walk, there are a couple of shops offering nuts and dried fruit on Karl-Marx-Straße. If you're still hungry, you can find a variety of vegan falafel on every corner.

After so much walking, we take a well-earned break in a beer garden, where Tom eats a vegan currywurst and drinks a local beer while enjoying the afternoon.

Figure 38: Limocello Spritz at Alaska Bar

Figure 39: Second course

Figure 40: Smoked radish and wine

Towards the evening, we have a small aperitif, Tom drinks a Limoncello Spritz and Silvana an Aperol Spritz. We skip the delicious vegan tapas today.

Then it's off to the highlight of the evening, a vegan-vegetarian restaurant that has been awarded a Michelin star since 2018. There are three of these in Germany. We order the 4-course menu with wine accompaniment and are delighted. Research if there is one in your city!

When visiting Berlin remember: There are also over 100 vegan restaurants in this city. So never fear to get hungry or bored [55]!

Figure 41: Algae caviar

LIST OF FIGURES AND BIBLIOGRAPHY

To save paper, we have refrained from printing the bibliography and list of figures. Scan the QR codes to access them online.

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+++ GOOD NEWS +++ GOOD NEWS +++ GOOD NEWS +++

Figure 43: Peggy Chan

Chef activists – a new generation of chefs

In her TEDx Talk, Peggy Chan introduces herself and other chef activists who not only wants her Michelin stars to shine, but also want to improve the world sustainably and take the initiative to do so. She argues that food literacy should be part of everyone's basic knowledge. What is food literacy? – Watch her TED talk:

Vegan Food Award

The animal rights organisation PETA presents the vegan food award every year. From drinks to chocolate bars, milk alternatives and restaurants, everything is included. Find out more about the award winners here or apply yourself:

Figure 44: PETA Vegan Food Award

No advertising for meat

Since 2024, advertising for meat and meat products has been banned in the Dutch city of Haarlem. Other cities and municipalities are now following suit and also banning advertising for other climate killers [56].

Economy between green washing and engagement

Without fundamental changes in our production methods and in our service industries, we will not be able to achieve the global climate targets. We need the commitment of business! That's why it's great when companies develop new concepts and join the global sustainability movement. At first glance, it is usually difficult to judge whether this is more of an advertising campaign to look more likeable or whether it has depth and is meant seriously. Either way, we are pleased that an airline no longer wants to advertise marine zoos and other animal attractions in order to protect the animals. And a large supermarket chain in Germany has announced that plant-based products will always cost less than the corresponding animal products. Keep up the good work [57, 58]!