Nutrition and the guiding principle of sustainability

Global challenges and problem-solving approaches on a national and international, UN level

Karl von Koerber, Julian Waldenmaier, Maike Cartsburg

Abstract

Humanity is facing many global challenges, some of which can be influenced by how we eat. Examples include the poverty and world hunger crisis, the consequences of the adoption of Western dietary habits in the Global South, climate change, water scarcity, soil degradation, species loss/deforestation and food waste. What are the possible solutions? Based on many years of research, a concept of Sustainable Nutrition is presented here as an example, including seven action-oriented principles. Programmes at the international level of the UN are also presented, including the 2030 Agenda with the UN Sustainable Development Goals (SDGs), the Global Action Programme on Education for Sustainable Development and the Sustainable Food Systems Programme. A survey showed that in Europe, only a few professional associations for nutrition provide dietary guidelines for consumers. Those that do take aspects of sustainability into account to varying degrees, with health-related aspects usually being given priority.

Keywords: sustainable development, globalization, world nutrition, climate change, biodiversity loss, SDGs, Education for Sustainable Development, plant-based diet

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Global challenges in the field of nutrition

The fundamental issues that this chapter will focus on are the global challenges that humanity is currently facing and the extent to which these challenges are associated with individual dietary behavior and the global food system.
When selecting literature on global challenges, preference was given to studies by UN institutions (e.g. the *Food and Agriculture Organization* [FAO], the *UN Environment Programme* [UNEP], *the United Nations Framework Convention on Climate Change* [UNFCCC]) or national governmental institutions (e.g. The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety [BMU], the German Environment Agency [UBA], and the German Federal Ministry of Food and Agriculture [BMEL]), as well as primary literature.
The evaluation shows that current global challenges include unjust distribution of resources/poverty crisis, the world hunger crisis, the consequences of the adoption of Western eating habits in the Global South, climate change, water scarcity, soil degradation, species loss/deforestation and food waste. Many of these challenges are related—either directly or indirectly—to individual dietary habits or to global food systems. These challenges are discussed in more detail in the following sub-chapters.

Unjust distribution of resources/poverty crisis

There is a huge gap in the distribution of global wealth: About two thirds of the world's population own only 3% of global wealth, while one third of the world's population owns more than 97% of it [1]. The number of people living in poverty is largest in Sub-Saharan Africa, followed by South Asia. These people mostly live in rural areas and are involved in agriculture. They tend to come from families with many children and have low levels of education. They are also at higher risk of

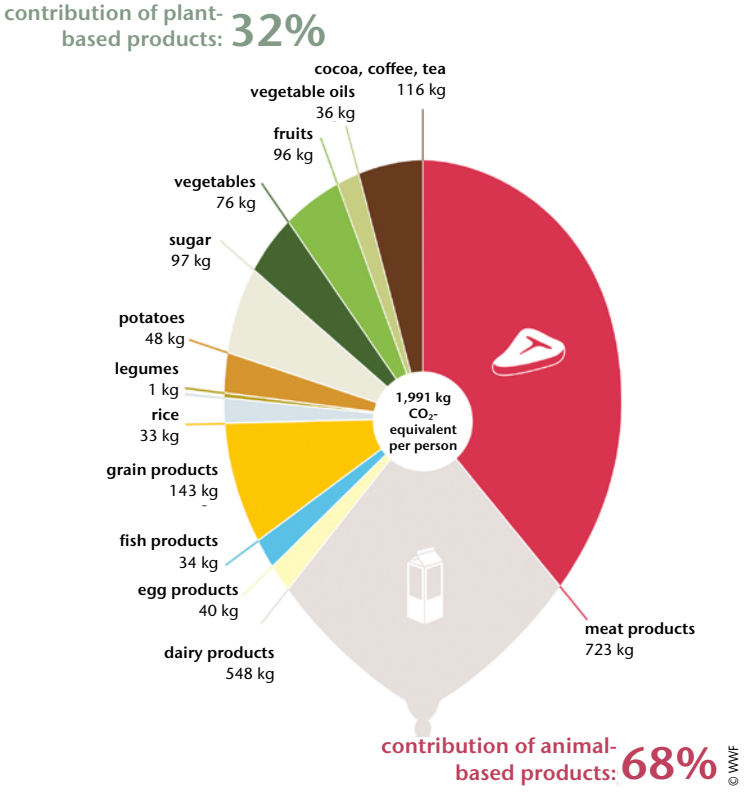

Fig. 1: **Greenhouse gas emissions of various food groups** [25]

undernutrition and micronutrient deficiency (Section "World hunger crisis") [2]. Increases in income lead to a reduction in the prevalence of undernutrition [3].

There are also major global differences in agricultural land use: it is much higher in rich, industrialized countries due to their very high consumption of animal-based foods. About 70% of the world's agriculturally viable land is pasture, and about 30% is arable land. In addition, about one third of the arable land is used to produce animal feed—mainly cereal crops and soy. Therefore, about 80% of the world's agricultural land is used to produce animal-based foods [4, 5]. However, animal-based foods (excluding fish) contribute only about 13% of global nutritional energy supply, and only about 28% of global protein supply [6]. If the crops produced on arable land were not used to feed animals, but were rather used entirely to feed humans, there would be about 70% more nutritional energy available globally.

In light of the growing world population, a plant-based diet is essential to global food security [7, 8]. Alongside this, the plentiful pasture available across the globe can be used to raise ruminants in order to produce animal products such as milk and beef, which can make an important contribution to global nutrition [9].

World hunger crisis

The FAO estimates that the worldwide absolute number of people suffering from hunger increased to 821 million in 2017 [10]. Climate-related catastrophes are exacerbating world hunger, as are the many violent conflicts that are going on [11].

Across the globe, there are at least 2 billion people with micronutrient deficiencies [12]. Among this group are approximately one in three women of reproductive age who are suffering from iron deficiency anemia—a situation that also jeopardizes the health of many children [11]. The number of women with iron deficiency anemia has increased further since 2012 [3]. Despite this, women play a key role in global agriculture [13].

Although the rural population is the population group most affected by undernutrition, small-scale farmers produce the largest portion of global food. This group would be able to produce food more efficiently and reliably if they had sufficient access to productive resources, but such access is hindered e.g. by land use conflicts and pricing policies [13].

Consequences of the adoption of Western eating habits in the Global South

Undernutrition is currently widespread. But at the same time, the global number of people who are overweight or obese is increasing [3], and consequently, the prevalence of diseases associated with energy-rich, unhealthy diets is also increasing [8]. According to the *Global Nutrition Report 2017*, 88% of countries for which data was available in the report had a serious burden of malnutrition (underweight, anemia and overweight) [3].

As a result of urbanization and economic development, eating habits are moving towards more animal products and more processed foods. Consequently, the prevalence of overweight and obesity is increasing, along with the prevalence of diseases in which nutrition plays a key role, such as type 2 diabetes mellitus, hypertension and some cancers. Thus, this change in eating habits is causing a double burden of disease for countries in the Global South [14].

Climate change

Extreme climate events such as floods, storms and forest fires lead to shrinking harvests or loss of harvests, which result in food insecurity and conflicts [15]. In the future, climate change will create additional burdens on agricultural systems, which will increase health, environmental and other risks as a consequence [16].

In Germany too, climate change is increasingly leaving its mark. In the last 15 years, decreasing yields have resulted in losses equivalent to approximately €470 million annually. More than half of these losses occurred as a result of dryness and drought, about a fifth were due to hail, and a sixth were due to storms, heavy rain and flooding [15].

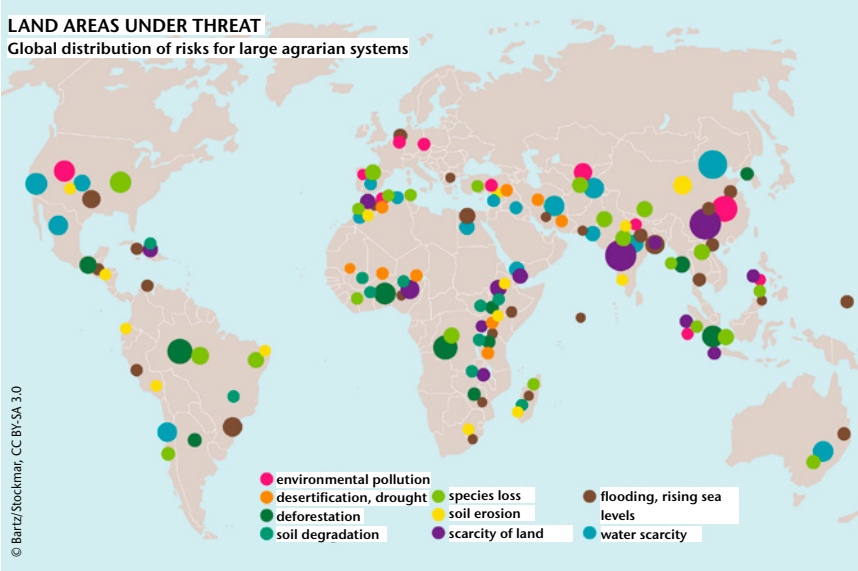

Fig. 2: **Land areas under threat: global distribution of risks for large agrarian systems** [33]

A transformation towards a climate-friendly society must counteract the negative trends of climate change. At the UN Climate Change Conference in Paris at the end of 2015, 195 countries pledged to limit global warming to 1.5°C or at most 2°C compared to pre-industrial levels [17].

The Intergovernmental Panel on Climate Change (IPCC) estimates that global food systems contribute up to 37% of net anthropogenic emissions of greenhouse gases [16]. In Germany, about 25% of greenhouse gas emissions come from the food sector [18]. Agriculture, including its prerequisite inputs such as the production of machinery and fertilizer, accounts for the largest share (45–60%), followed by consumers, who account for around 20%. The proportion contributed by the part of the chain that comprises processing, packaging, transport, storage and sales is between 1 and 12% [19–24].

Out of all greenhouse gas emissions in Germany, animal-based products contribute about 68%, whereas plant-based products contribute only about 32% [25] (◆ Figure 1). Despite this, animal products provide only around 30% of daily energy intake, while plant products provide about 70% [26]. This illustrates how animal products place systemically a much larger burden on the climate (◆ Figure 1).

Water scarcity

Even though access to clean and safe water is a human right [27], about 768 million people worldwide do not have reliable access [28]. Furthermore, 4 billion people currently live in areas where water is scarce for at least one month a year – about half of these people live in India or China [29].

According to estimates, the need for water will increase further in the coming decades [8]. The global demand for water is increasing not only due to agriculture, which consumes 70% of the world's water, but also due to industry and energy production, as well as accelerated urbanization and the associated need for municipal water supplies and sanitation [30]. The situation is also being exacerbated by changing consumption patterns (more animal products), the expansion of agriculture that uses irrigation, and the growing world population. Our eating habits clearly make a massive contribution to water consumption. For example, about 16,000 L of "virtual water" is needed to produce 1 kg of beef. For the same weight of wheat, only 1,150 L is needed [31]. "Virtual water" is the total quantity of water that is needed or that is polluted or evaporated in the process of producing a product.

Importation of irrigation-intensive foodstuffs such as soybeans, cereals, coffee, tea, cocoa and beef from countries that suffer from water scarcity can intensify the problem in those countries because it leads to indirect loss of water [32].

Soil degradation

Soil degradation is a significant deterioration in the quality of the soil until it is completely worn out. In Europe, soils have already lost 45% of their organic matter due to unsustainable agricultural practices, and as a result, they have lost fertility. The reasons for this are decades of use of mineral fertilizers and pesticides, monocultures, lack of intercropping, and use of intensive irrigation and high-performance seed [33].

Other forms of soil degradation include salinization, acidification, contamination with (in)organic pollutants and wind and water erosion. These forms are also the result of unsustainable soil management [34].

Unfavourable soil management leads globally to the loss of about 24 billion metric tons of fertile soil annually. In the EU, 35% of agricultural land is showing signs of compaction. In Germany alone, 77 ha of soil are lost every day [33].

Between 15 and 20% of the global population is affected by various forms of soil degradation. This negatively impacts agricultural yields, which in turn contributes to poverty and malnutrition [34].

However, it is also important to note that soils are the world's second-largest carbon store after the oceans, which means they are crucial to the climate [34]. For various reasons, it is therefore essential to preserve fertile soil, or to build it up as far as possible, which can be done in particular with organic farming or regenerative agriculture.

The world's major agricultural systems are not only at risk due to soil degradation, but also due to other threats (◆ Figure 2). The most populous countries, China and India, are particularly vulnerable to these threats [33]g

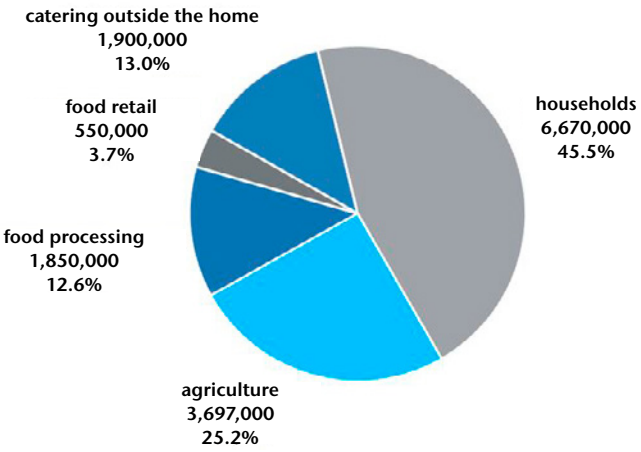

Fig. 3: **Food loss and food waste in Germany: approx. 14.7 million t per year** [42]

Species loss and deforestation

Currently, one in five mammal species around the world is considered to be at risk of extinction, as well as one in eight bird species and one in three amphibian species. In addition, more than 60% of all recorded plants are under threat [35].

Reasons for the loss of plant and animal species include environmental pollution, habitat destruction, climate change, the introduction of new species, uncontrolled extraction from nature (for instance in the form of overfishing), and agricultural focus on just a few species [8, 36].

Biodiversity in agriculture includes food that we humans eat or food that supports food production. Therefore, biodiversity loss is directly linked to human nutrition and well-being [8].

Over 80% of Earth's biodiversity is found in forests [36]. Forests also provide a place to live, nutrition security, protection, water and fuel for more than 2 billion people [28]. Furthermore, they protect against erosion, floods and avalanches and are enormous carbon stores. Therefore, deforestation has grave consequences. Every year, 4.2 million hectares of ancient forest are lost worldwide, almost exclusively in the tropics. Through the conversion of forests into agricultural land (e.g. to grow animal feed for industrial meat production), our diet contributes to deforestation and therefore also to species loss [37].

Insect diversity is also being lost at an alarming rate, and this is set to increasingly endanger ecosystems. It is estimated that 80% of wild plants depend on insects to pollinate them [38]. Pollination by insects and other animals is also involved in 35% of global cereal production [36], and 60% of birds depend on insects for food, meaning that their existence is also threatened. In German nature reserves, insect biomass has reportedly declined by about 75% in 27 years. This is alarming because nature reserves help to preserve biodiversity and ecosystem functions [38].

Food waste

Globally, about 1.3 billion metric tons of food is wasted each year – it is either lost or thrown away. This is equivalent to about a third of the world's entire yield of food for human consumption [39].

In Europe and North America, it is estimated that consumers waste about 95–115 kg per person per year, which is many times more than consumers in Sub-Saharan Africa or South Asia, who waste about 6–11 kg per person per year. The reasons for food wastage in the Global South are usually a lack of appropriate storage and refrigerating appliances, poor infrastructure, or poor packaging systems. In the Global North, food wastage is mostly caused by consumer behavior [39].

In Germany, the total amount of food loss (from agriculture, food processing and retail) and food waste (from catering outside the home and private households) is about 15 million metric tons. Each German citizen throws away an average of 81.6 kg of food each year [40] – this corresponds to about one third of all edible food [41]. Of this, 53 kg per person per year is either waste that would have been fully edible at the time of disposal, or would have been edible if used in time (so-called avoidable waste), or it is waste generated by consumer habits, e.g. not eating bread crusts or apple peel (so-called partially avoidable waste). When accounted for as purchased goods, this 53 kg is equivalent to €235 per person per year [40].

Most food loss and food waste is caused by private households, followed by agriculture, catering outside the home, food processing and retail (◆ Figure 3) [42]. In private households, vegetables (26%), fruit (18%) and bakery products (15%) account for the largest share of avoidable and partially avoidable food waste [40].

Frames of reference and programs at the international, United Nations level

What measures have the United Nations (UN) decided to take in order to find a solution to the global challenges described above? How are these global measures being implemented in Germany?

In order to answer these questions, a web search was conducted on the relevant websites of the UN, the German Federal Government and Federal Ministries.

One of the earliest frames of reference are the human rights, including the right to food. A few years ago, the 2030 Agenda was adopted as an international action plan, incorporating the UN Sustainable Development Goals. In order to implement this plan, the UN has adopted several global programs that are being implemented in the individual nation states. The frames of reference are discussed in more detail in the following sections.

Fig. 4: **UN Sustainable Development Goals (SDGs)** [50]

Human rights/right to food

The right to food has been part of the UN Universal Declaration of Human Rights, Article 25, since 1948: "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services (...)." [43]

This internationally recognized human right was enshrined in international law in 1976 when the International Covenant on Economic, Social and Cultural Rights, which was ratified by more than 160 states, came into force [44]. According to this covenant, every human being must be granted the right to eat in dignity, i.e. every person must have permanent access to resources in order to make healthy food choices [45]. However, this right is not guaranteed for many people.

The UN Committee on Economic, Social and Cultural Rights monitors compliance with the right to food by requesting reports from states every five years to assess their human rights situation. The UN Special Rapporteur on the Right to Food and the UN Human Rights Council are also involved in this. Non-governmental organizations (NGOs) also play a key role in exposing human rights violations [46, 47].

2030 Agenda – Sustainable Development Goals (SDGs)

The 2030 Agenda (full, official UN title: Transforming our World: the 2030 Agenda for Sustainable Development) is an action plan that was adopted by the international community in New York in 2015. It focuses on people, planet, prosperity, peace and partnership. Key to its implementation are the 17 Sustainable Development Goals (SDGs) (◆ Figure 4). These are designed to lead to results such as climate protection, global nutrition security and justice [48]. These goals replace the *Millennium Development Goals* from the year 2000 and they also place explicit obligations on industrialized countries. The 2030 Agenda is not a legally binding agreement, but it does make reference to "full respect for international law", which is based on the Universal Declaration of Human Rights. The preamble emphasizes that the 17 goals "seek to realize the human rights of all." [48]

According to the *Global Nutrition Report 2017*, all of the 17 SDGs are interlinked with nutrition in some way – nutrition is even referred to as an "indispensable cog" when it comes to achieving them. This means that the SDGs can be supported through dietary habits that are geared towards sustainability. Conversely, measures to support the SDGs can help to overcome undernutrition [3] (more details in [49]).

In Germany, the German National Sustainability Strategy serves as the guideline for implementing the 2030 Agenda. This strategy "outlines the importance of sustainable development for the Federal Government's policies and defines concrete targets and measures over the entire range of political issues. It thus provides a benchmark for the required long-term perspective. All federal institutions are called upon to contribute to achieving the targets with activities in their own fields." [51]

In November 2018, the German federal government decided to update the strategy, which focuses on a range of issues including nutrition. One of the changes was a commitment to provide greater support to governments of countries affected by food insecurity in order to achieve global food security, and another was a commitment to expand organic farming to 20% of cultivated land by 2030 [52].

Global Action Programme on Education for Sustainable Development (ESD)

The UN General Assembly entrusted the United Nations Educational, Scientific and Cultural Organization (UNESCO) with the implementation of the Global Action Programme (GAP) on Education for Sustainable Development (ESD) for the period from 2015 to 2019. The program has been extended by five years and is intended to contribute to the implementation of the 2030 Agenda, i.e. the transformation of society towards sustainability. ESD is viewed as key to this [53]. To this end, SDG 4.7 defines ESD as an independent field of action that calls upon the self-obligated states party to the 2030 Agenda to implement the Global Action Programme on ESD [54].

The Global Action Programme is based on the roadmap with international goals and strategies and five priority fields of action [54]:

1. Advancing policy
2. Transforming learning and training environments
3. Building capacities of educators and trainers
4. Empowering and mobilizing youth
5. Accelerating sustainable solutions at local level.

The German Federal Ministry of Education and Research (BMBF) has established the Na-

tional Platform Education for Sustainable Development and accompanying bodies in order to implement the Global Action Programme on ESD. In 2017, this platform adopted the National Action Plan on ESD, which contains 130 goals and 349 concrete recommendations for action. It aims to address all areas of education (universities, schools, early childhood education, vocational training, non-formal and informal learning) in order to structurally anchor ESD within the education sector. This requires commitment from the political, scientific, and business communities, as well as civil society [55].

The portal → www.bne-portal.de was set up by the German Commission for UNESCO with funding from the BMBF as a central German information hub on the topic of ESD and to improve networking between stakeholders [56].

10-Year Framework of Programmes on Sustainable Consumption and Production Patterns/Sustainable Food Systems Programme

In 2012, the UN Rio+20 Conference on Sustainable Development in Rio de Janeiro adopted the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns. In addition to five other programs, this includes the Sustainable Food Systems Programme (SFSP), which was created with the participation of the UN organizations FAO and UNEP [57].

The goal of the SFSP is national, regional and international networking of stakeholders along the entire food value chain in order to promote change in the direction of sustainable consumption and production (SCP) worldwide.

Its aims are:

1. Raising awareness on the need to adopt SCP patterns in food systems
2. Building enabling environments for sustainable food systems
3. Increasing the access to and fostering the application of actionable knowledge, information and tools to mainstream SCP in food systems
4. Strengthening collaboration among food system stakeholders to increase the sector's SCP performance

To implement this in Germany, the federal government has adopted the National Programme on Sustainable Consumption, which includes other fields of action in addition to nutrition [58].

Education for Sustainable Development (ESD)

"ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning, and is an integral part of quality education. ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment. It achieves its purpose by transforming society." [54]

Integration of aspects of sustainability into the nutritional recommendations of European professional associations

Food-Based Dietary Guidelines (FBDG), which are often published in the form of national dietary guidelines, traditionally include factors such as health-related aspects of nutrition, supply of nutrients and energy, and eating habits [59]. However, it is clear that dietary recommendations that do not take environmental aspects or aspects of a Sustainability into account have the potential to significantly increase greenhouse gas emissions [60]. Analysis of diets based on specific national nutritional guidelines showed that these diets have a reduced environmental impact [61]. The Planetary Health Diet[1], which was prepared by the EAT-Lancet Commission, confirms these results [8]. It is therefore logical that professional associations and government ministries include references of a Sustainable Nutritionary guidelines. According to a recent global survey, Australia, Brazil, Denmark, Germany, Estonia, Finland, Qatar, the Netherlands, Sweden, Uruguay and the UK have all included aspects of sustainability in their national or official dietary guidelines. The guidelines recommend measures such as avoiding food waste or giving preference to plant-based foods to varying degrees [61].

The authors set out to establish what the status quo is for the nutritional recommendations of professional nutritional associations in the European area. In order to do this, the online information provided by 24 European professional associations that are members of the Federation of European Nutrition Societies (FENS) was evaluated. The websites included in the analysis were those that were available in English, French or German: they were located in Austria, Belgium, Denmark, France, Finland, Germany, the Netherlands, Ireland, the UK, Austria and Switzerland.

Only in Germany, Austria and Switzerland did the professional associations provide dietary recommendations for consumers. Other professional associations took the view that their main task was to facilitate networking and the exchange of ideas within the scientific community. There are marked differences in the dietary recommendations with regard to the extent to which aspects of sustainability are taken into account.

[1] More detailed information is available in DGEinfo 6/2019 and in Ernährungs Umschau 7/2019

Concept of a Sustainable Nutrition by the Working Group Sustainable Nutrition e. V. as an example in Germany

The five dimensions of a Sustainable Nutrition

The guiding principles of sustainability are usually represented by three pillars: environment, economy and society. This was brought to the attention of the general public at the UN Conference on Environment and Development in Rio de Janeiro in 1992. When it comes to dietary issues, it makes sense to include health as a fourth pillar in its own right. A few years ago, we added culture to our concept as the fifth dimension because cultural background influences eating habits (◆ Figure 5).

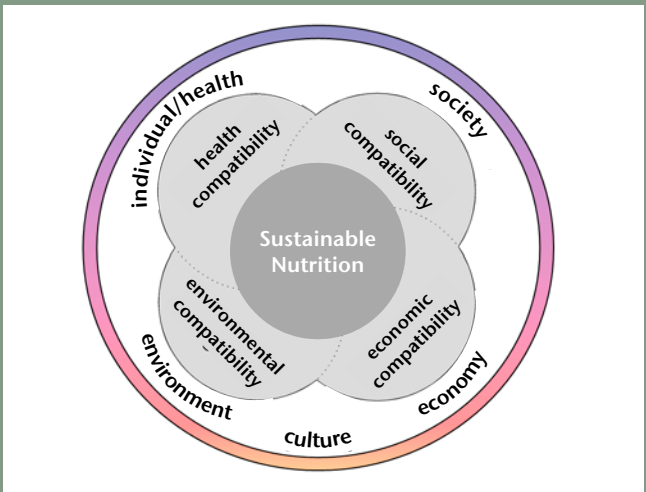

Fig. 5: **The five dimensions of a Sustainable Nutrition** [68, 69]

The food value chain

All stages of the food value chain are taken into account:
- prerequisite production (production of machinery, fertilizers, pesticides, etc. for agriculture)
- production in agriculture
- food processing
- marketing of foods
- preparation of meals at home
- disposal of waste (food packaging and organic waste).

Seven principles of a Sustainable Nutrition

Since wholesome nutrition and nutrition ecology began as a concept in the working group of Prof. Claus Leitzmann at the University of Giessen in the 1980s, we have been involved in the development of principles, building on student activities in the 1970s. The seven principles of a Sustainable Nutrition serve as approaches to solving the global challenges described above and as practical guidelines for action.

Principles for a Sustainable Nutrition
(according to [68, 70])
1. Preference of plant-based foods
2. Organic foods
3. Regional and seasonal products
4. Preference of minimally processed foods
5. Fair Trade products
6. Resource-saving housekeeping
7. Enjoyable eating culture

To save space, a reference is made here to the more detailed descriptions of the principles together with the reasons behind these based on five dimensions of sustainability: [68–73].

Online video course: "Sustainability and Nutrition"

The online video course "Sustainability and Nutrition" (in German) presents the titular concept via a clear and easily accessible medium. The aim is to enable the participants (multipliers, scientists, students, representatives from the political, media, and business sectors as well as consumers) to critically examine the effects of personal eating habits and global food systems and to identify and implement possible solutions.
The course comprises 18 learning units of 30–60 minutes, each with learning goals and tasks for deepening understanding. It was recognized by the UN *Sustainable Food Systems Programme* as an *Affiliated Project* [74].

With its 10 guidelines, the German Nutrition Society (DGE) aims to provide dietary recommendations that are easy to understand. The German Nutrition Society website highlights links with sustainability in 9 out of 10 guidelines, in addition to explaining them. In the first guideline "Enjoy food diversity" the consumption of predominantly plant-based foods is recommended and it is explained that a diet that follows the 10 guidelines is healthy and sustainable: "Producing plant-based foods consumes fewer resources and emits less harmful greenhouse gases than producing animal-based foods."[2] The seventh guideline "Water is the best choice" recommends mainly drinking tap water. This is meant to reduce the amount of packaging materials used for water and avoid the need for transportation. In addition, it is recommended that when buying food that comes via a long trade route such as

[2] Citation from German source translated by the editors.

coffee, tea and cocoa, fair trade products should be preferred in order to improve working conditions in the producing countries [62].

The Austrian Nutrition Society (ÖGE) mentions ecological aspects of a diet based predominantly on plant-based foods in the first of its 10 dietary guidelines: "Eat and enjoy a wide range of foods – enjoy food diversity with a balanced and varied diet. Slow, conscious eating promotes enjoyment as well as satiety. Choose mainly plant-based foods and take the ecological aspects into account."[2] The seventh guideline also makes an indirect reference to choosing minimally processed foods over processed foods, which carries with it advantages for both health and the environment: "[…] Don't just cut down on visible fat. Be aware of hidden fats in sausages, cheese, baked goods and confectionery, sauces, fast food and ready meals."[2] [63].

In the Swiss food pyramid, the Swiss Society for Nutrition (SGE/SSN) mentions ecological and social aspects in several places in addition to the health reasons for its nutritional recommendations. These include preferring plant-based foods, food produced in a way that is as environmentally-friendly and animal-friendly as possible, seasonal food, regional food and fair-trade food, and avoiding food waste [64]. Further comprehensive tips on sustainable eating and drinking can be found in the FOODprints, which explicitly address effects on the environment, the economy, society and animal welfare. These resources include of a Sustainable Nutritiony-related recommendations regarding origin, production conditions and purchasing behavior [65].

In non-German-speaking countries, other institutions that are not FENS members are responsible for disseminating the national dietary guidelines. In the northern European countries and Estonia, for example, the guidelines are based on the Nordic Nutrition Recommendations, which take aspects of sustainability into account [66]. For instance, in Sweden, the maximum recommended intake of meat is based on health aspects, but consumers are clearly informed about the environmental impacts of high meat consumption and about animal welfare aspects [67].

Discussion

In German-speaking countries, the extent to which aspects of sustainability are integrated into the nutritional recommendations issued by professional associations varies. Here the focus is also mainly on health. In various countries, including those outside the German-speaking area, it is becoming apparent that increasing consideration is being given to aspects of sustainability, for example at scientific conferences, in quality standards, in further training and education measures, and in campaigns.

In addition, universities and other institutions have become increasingly active in research into Sustainable Nutrition. Therefore, in 2017, a German-speaking network for sustainable nutrition systems was formed on the initiative of NAHhaft e. V., and the online platform *"Ernährungswandel"* ("Nutritional Change") was also set up (→ www.ernaehrungswandel.org).

Even though the national dietary guidelines are published by ministries and other institutions in many countries, the aim of professional associations for nutrition should be to contribute to the increased inclusion of current aspects of sustainability that go beyond the traditional health-related factors. An updated, complete survey of all national nutrition guidelines, including those issued by institutions that are not FENS members, is desirable.

Conclusion

Global challenges in the field of nutrition are enormous and urgently require integrated solutions at various levels in order to positively influence global living and environmental conditions. Transformation of society towards sustainability can only be achieved through the cooperation of various stakeholders:

- consumers (individually and in associations such as urban gardening, community-supported agriculture, transition towns, food councils)
- scientific community
- educational organizations
- initiatives/NGOs
- media
- economic sector
- political sector.

In order to contribute to the implementation of the UN Sustainable Development Goals (SDGs) or the global UN programs, we believe it is necessary to focus on the following in terms of nutrition at the consumer level: a predominantly plant-based diet, consisting of organic, regional, seasonal and fairly produced foods that are minimally processed. Through each of their purchases, consumers decide what will happen in the upstream stages of the value chain. The aim is a healthy diet that is environmentally-friendly, socially feasible, economically affordable and culturally adapted.

In order to achieve this goal, professional associations for nutrition will need to place a greater focus on the global challenges and the various dimensions of the guiding principle of sustainability in their dietary recommendations. Nutrition professionals such as nutrition scientists and dietitians are also called upon to actively support this process of transformation within their respective spheres of influence. Furthermore, Education for Sustainable Development should be integrated into the activities and cooperation with stakeholders in this field should be ensured.

Conflict of Interest
The authors declare no conflict of interest.

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