# Sustainable Diets

## Why, what and how

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This year has seen the devastating effects of hurricanes, monsoons, droughts and earthquakes. Although these are considered natural disasters, it's been suggested their severity is linked to climate change. While this is a matter of debate, scientific experts do agree that climate change is real, is caused by human activity and will have a real impact on human lives. But what has this got to do with nutrition professionals? Ongoing research is finding synergies between dietary patterns that are good for the environment and those that are beneficial for health. As such, nutrition professionals are in an ideal position to get involved in the sustainable discussion.

### The challenge

Food is either the major, or one of the major drivers, of climate change, water stress, land use, biodiversity loss, soil erosion, deforestation and depletion of fish stocks.[1, 2, 3] A growing population, which is estimated to reach over nine billion by 2050,[4] and a trend towards a more 'Western' style of eating, will require more food to be produced, in particular meat and animal products. The global demand for animal protein has been predicted to increase by 80% between 2006 and 2050.[5]

If we carry on as we are, experts suggest we will need to double food production by 2050 compared to 2010.[6] This will require 120% more water, 42% more cropland and a loss of 14% more forest, resulting in enough carbon dioxide to create 2 degrees of global warming, as well as losing much of the world's biodiversity.[7]

Related to this is the issue of food waste – estimates suggest around 50% of all food is wasted. This is both food wasted from farm to fork and the excess that's eaten surplus to nutritional requirements.[8, 9] Reducing waste would not only benefit human health (reducing calorie intake), but savings would also be made in the valuable resources used in food production (energy, land and water), as well as transport emissions.

### Environmental impact of the food system

The food system today is destroying the environment upon which future food production relies. Globally, food production accounts for around a quarter of all Greenhouse Gas Emissions (GHGe),[1] which is more than the world's entire transport system.[10] The majority of GHGe related to food are produced at the agricultural stage. The rearing of livestock for meat, dairy and eggs alone generates 14.5% of the total GHGe and utilises around 80% of agricultural land use.[3, 11] Furthermore, agriculture is the leading cause of deforestation, land use change and biodiversity loss.[2, 3]

To address the issue of global warming, world leaders have agreed on the goal of limiting global mean temperature rise to no more than 2° Celsius above pre-industrial levels.[12] The UK has committed to reduce GHGe by at least 80% on 1990 levels by 2050.[13] It is now recognised that advances in technology in the production of food alone will be insufficient to meet targets set for the reduction in GHGe. To achieve these targets dietary intakes will need to change.[7]

To help identify the changes required, over recent years research has developed which specifically focuses on the relationship between food choices, nutrition, and the environment.

### What is a sustainable diet?

Sustainability comprises three 'pillars' of importance – social, environmental and economic.

Definitions of sustainable diets vary, from the very narrow, just looking at environmental impacts, and narrower still, one element of the environmental impact (GHGe), to incorporating the wider context of sustainability (social and economic).

A very comprehensive description, which brings in the three 'pillars' of sustainability, is provided by the Food and Agricultural Organisation (FAO) of the United Nations:

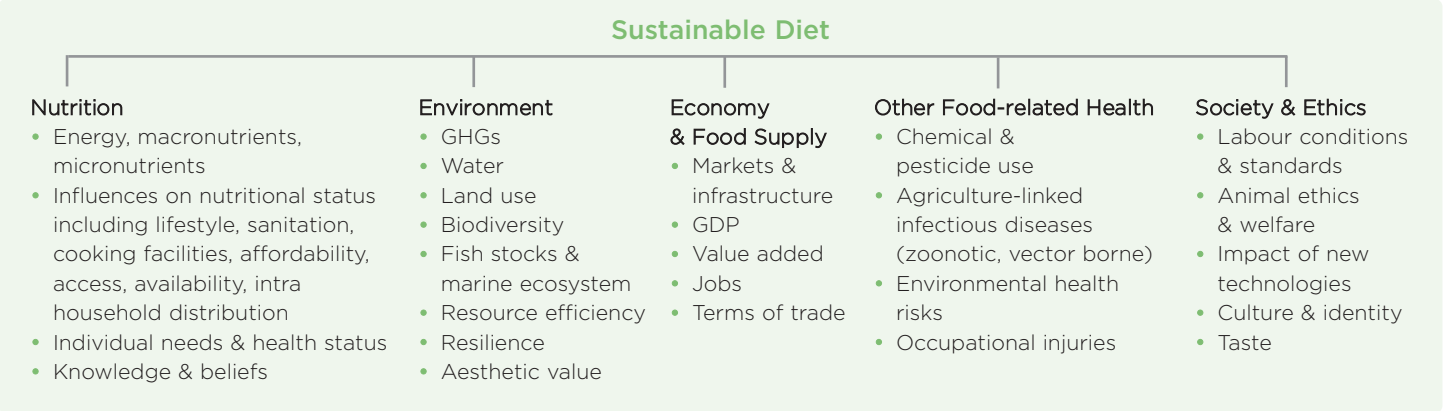
*'Sustainable diets have low environmental impacts and contribute to food and nutrition security and to healthy life for present and future generations... Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimising natural and human resources...'*[6]

**Figure 1** highlights the range of characteristics which ideally need to be considered when considering the wider context of a sustainable diet.

The challenge is to visualise this in practice. To date, most of the research on sustainable diets has focused on the environmental impacts of food production. As such, we now have a fairly good idea of what diets that have a lower environmental impact, but are also consistent with good health, look like. What is less clear is what diets that meet all the FAO's criteria look like. Moving forward, it's essential future research focuses attention on social, ethical and economic dimensions and their interface with health and the environment in order to achieve a more rounded understanding of sustainability in relation to eating patterns.

The studies examining the environmental impact of food and dietary patterns can be categorised into three main areas:

Figure 1: Defining a Healthy Sustainable Diet[2]




1. **Studies identifying foods with a low environmental impact**

Findings from these studies generally suggest plant-based foods have a lower environmental impact than animal products, requiring less land, water, energy and producing fewer GHGe.[3, 5, 14, 15, 16, 17] Emissions are on average smaller, as the efficiency of producing food calories or protein can be 4-20 times greater without the intermediate step of feeding livestock.[17]

A report prepared in advance of the United Nations Conference of the Parties 21 (COP21) in Paris, reviewed the scientific literature examining the role of reducing animal product consumption in meeting climate change mitigation targets.[18] Findings from these studies suggested that substantial global reductions in meat intake by 2050 could reduce agriculture-related emissions by 55-72%, with greater reductions from also reducing dairy and eggs. A global reduction in meat and dairy intake by 75% by 2050 could reduce emissions by an amount greater than the emissions from the entire transportation sector in 2010.

2. **Studies examining the environmental impact of dietary patterns that differ in their animal product intake**

As foods are not eaten in isolation, other studies have examined the environmental impact of different dietary patterns. Typically, these studies have found patterns with the lowest environmental impact are those centred on the consumption of a diverse range of plant foods (e.g. vegetables, fruits, legumes, seeds, nuts, whole grains), while the intake of animal products generally correlate with higher GHGe.[19, 20, 21, 22]

A systematic review examined the changes in GHGe, land use, and water use, from shifting current dietary intakes to environmentally sustainable dietary patterns.[19] Sixty studies were included and 14 sustainable dietary patterns were identified, e.g. vegetarian, vegan, pescatarian, replacing ruminant with monogastric meat (such as chicken), balanced energy intake, following healthy guidelines, Mediterranean diet, New Nordic diet, etc. Reductions as high as 70-80% of GHGe and land use, and 50% of water use could be achieved by adopting sustainable dietary patterns. The largest environmental benefits were seen in those diets which most reduced the amount of animal-based foods.

While it is generally considered that adopting general healthy eating guidelines would reduce dietary GHGe,[23, 24] it is important to consider the choice of foods to replace animal protein. Some isocaloric substitutions possibly increase total diet GHGe (for example replacing meat with dairy).[21] In an analysis of the UK National Diet and Nutrition Survey (NDNS Rolling Programme 2008/9 and 2009/2010), compliance to a healthy diet (comprising of a fat intake of 35% energy, saturated fat intake of 11% energy and five fruit and vegetables a day) indicated little effect on sustainability.[25] In general, there was little difference in overall meat and dairy intake in those achieving the healthy eating guidelines, they had simply selected lower fat options.

3. **Modelling studies which take into account other elements of sustainability**

Limitations of studies examining dietary patterns is that they may fail to take into account other elements of sustainability. Modelling studies apply constraints (e.g. meeting nutritional targets, making the diet no more expensive than current diet, minimising the types of food changes, etc.) to current dietary intake to determine the environmental impact.

When devising the new Eatwell Guide, modelling was used to determine the new segment sizes taking into account acceptability and revised nutrition recommendations (e.g. fibre). Using this method ensured that any adaptations made were realistic and not too far removed from the current dietary habits of the UK population, but at the same time met nutrition recommendations. Greater emphasis is now placed on the starchy foods and fruit and vegetables, whose segment sizes have increased. Whereas dairy foods and meat and other proteins have decreased. To achieve the Eatwell Guide scenario requires 'fruit and vegetable' consumption to increase by 54%; 'starchy foods' to increase by 69%; 'beans, pulses, fish, eggs and meat' to fall by 24% and 'dairy group' to fall by 21% compared to current consumption.[26] The Carbon Trust has calculated that achieving the new 'Eatwell Guide' scenario would result in reductions in GHGe, water use and land use, bringing all three within globally sustainable levels.[27]

A number of reviews have also modelled the concurrent health benefits when adopting a sustainable diet.[19, 22] Transitioning toward more plant-based diets that are in line with standard dietary guidelines could reduce global mortality by 6-10% compared with a reference scenario in 2050 according to one review.[22]

## How to achieve a sustainable diet in practice

Various organisations have identified the main characteristics associated with a sustainable diet based on the nutritional, environmental and health elements.[2, 28, 29, 30, 31, 32, 33, 34] A summary of these collective characteristics, along with personal views acquired from the current research in this field, are highlighted in **Table One**.

## Role of nutrition professionals in sustainability disussions

Having identified the main characteristics of diets that have both a low environmental impact and are consistent with good health, a bigger challenge is how to encourage people to adopt such a diet. A study conducted by the Eating Better organisation explored public awareness of the environmental impact of food and willingness to reduce meat consumption. Drivers for change and subsequent opportunities to shift towards a more sustainable diet were identified.[35] Nutrition professionals can influence a number of these (**Table Two**).

### Table One: Characteristics of Diets with Low Environmental Impact and Consistent with Good Health

| |
|---|
| Eat a balanced diet, including a wide variety of foods, to maintain a healthy weight |
| Eat more plant-based foods<br>• At least 5 portions of fruit and vegetables:<br>- Include more root vegetables, brassicas such as broccoli, cauliflower and cabbages as they have lower impacts than salad vegetables<br>- Choose seasonal fruit and vegetables<br>- Be aware of produce that is fragile (berries and salads), grown in protected conditions (hot housed tomatoes and cucumbers), requires refrigeration (salads), very rapid and energy intensive modes of transport (green beans, mange tout, berries from the southern hemisphere) as they are more GHG intensive<br>• Base meals on starchy foods – bread, potatoes, pasta and other grains choosing wholegrains where possible<br>• Enjoy more plant sources of protein – peas, beans and nuts<br>• Try fortified plant-based alternatives to dairy |
| Eat less animal-based foods<br>• Moderate meat intake, limit processed meat, and consider consuming all animal parts, e.g. offal<br>• Have milk and dairy in moderation, or choose fortified, plant-based alternatives |
| Eat at least 2 portions of sustainable sourced fish a week, one of which should be oily – choose from credible, certified suppliers |
| Choose unsaturated fats and oils, e.g. rapeseed oil, and eat in small amounts |
| Eat fewer foods higher in fat, sugar and salt |
| Drink tap water in preference to other beverages |
| Value your food – ask where it's come from |
| Do not waste food |

### Table Two: Drivers for Change and Opportunities for Shifting Towards a More Sustainable Diet

| Driver | Opportunity | Role of nutrition professional |
|---|---|---|
| Habits | Non-meat or lower meat choices to be good value, accessible and desirable tasty choices. | • Provide practical advice, such as meat free recipes, recipes including more plant protein, how to increase fruit, vegetables and wholegrains |
| Cultural significance of meat eating | Opportunity to draw on traditional diets based on low meat/plant-based eating | • Educate on different types of plant-based diets, e.g. Mediterranean diet, Asian and Middle Eastern cuisine |
| Price/cost | Lower meat diets can save money and enable 'better' meat choices within the same budget | • Educate and provide practical suggestions<br>• Advice on how to use leftovers, portion sizes, seasonal fruit & vegetables, etc. to minimise waste and save money |
| Interest in Health | Promotion of strong public health messages on health benefits. | • Highlight health benefits<br>• Practical advice to ensure nutritional adequacy<br>• Bust nutritional myths, e.g. protein and iron adequacy |
| Awareness of the environmental impact | Awareness raising campaigns, information, education and better labelling (where appropriate) | • Provide information and educate on the role of the food system on the environment<br>• Reconcile the nutritional and environmental science to give consistent messages about a healthy sustainable diet |
| Knowledge about alternatives to meat and dairy | Growth in meat and dairy alternative market. Provides opportunities for consumers to transition to a more plant-based diet | • Advise on suitable alternatives to ensure nutritional adequacy |

**Disclaimer:** This article was commissioned by Oatly, manufacturers of oat-based products. The views expressed are those of the author and not necessarily those of Oatly.

## Conclusion

What we eat has a profound effect on the planet. Based on current trends the global food demand is neither feasible nor sustainable. As well as technological improvements, a change in dietary intake is required along with addressing waste and overconsumption. Dietary patterns with fewer animal products, and based on plant foods, such as pulses, nuts, seeds, fruits, vegetables and wholegrains, are both healthier and have a lower environmental impact. Nutrition professionals have the knowledge to provide information that align both health and environmental dietary messages and need to work together with others, such as farmers, chefs, industry, public health authorities, to drive change to improve people's lives and that of the planet. Future research needs to focus on social, ethical and economic dimensions, in order to achieve a more rounded understanding of sustainable eating.

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