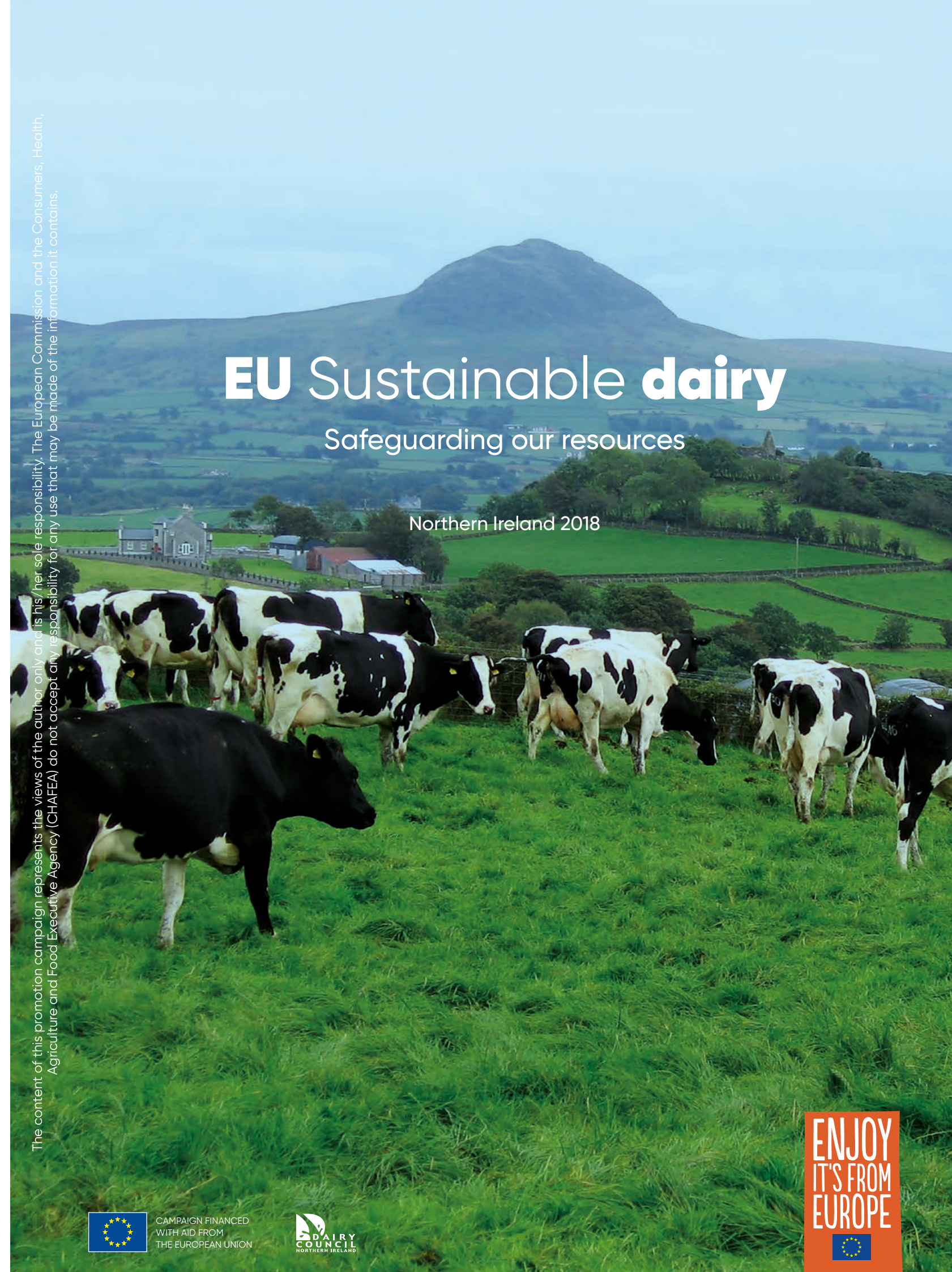


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# EU Sustainable dairy

Safeguarding our resources

Northern Ireland 2018

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**Nutrition**

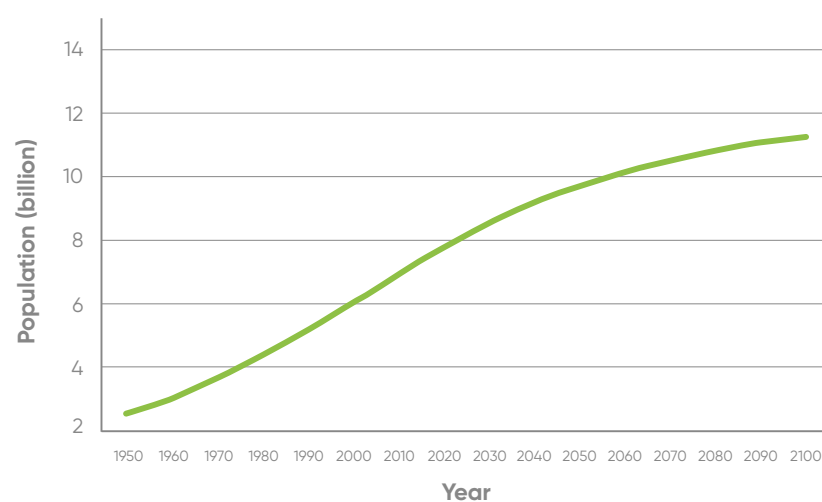


# Introduction

*What is sustainable diet and why is it relevant? It is too simplistic to look only at climate impact?*

## How do we feed a growing population?

Data from the UN's Food and Agriculture Organization, FAO shows that one billion people suffer from hunger and a further billion people suffer from "hidden hunger", which is nutritional deprivation even when the supply of foods is sufficient, because of a poor diet quality.



Source: United Nations, Department of Economic and Social Affairs, Population Division (2017).  
World Population Prospects: The 2017 Revision. <http://esa.un.org/unpd/wpp/>

This need for available, affordable and nutritious diets for the growing global population is challenged by the need to reduce our use of resources and impact on the planet. How can these conflicting demands be met?

## The need for a holistic concept of sustainable diet

In our search for new ways of producing and consuming foods in a sustainable manner we must first start with a concept of sustainable diets. Such a definition has been established by the UN Food and Agriculture Organization in 2010 with its publication Sustainable Diets and Biodiversity:

*"Sustainable diets are those diets with low environmental impacts which 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 optimizing natural and human resources" (FAO, 2010).*

Sustainable diets are **protective** and respectful of biodiversity and ecosystems, **culturally** acceptable, accessible, **economically** fair and affordable; **nutritionally** adequate, safe and healthy.



# Unfolding the Four Dimensions

## 1. Climate impact of specific foods

### Carbon footprint is only part of the picture


Today the metrics for measuring the sustainability of foods is often solely linked to emissions of greenhouse gasses (GHGE) per kg food. When looking solely at this metric, animal products in general emit more carbon than plant-based products per kg of the product. Thus theoretically, carbon emission from diets could be reduced by eating only plant-based food.

But in reality, the calories and nutrients lost by avoiding animal products must be compensated by a lot of other plant-based products, which also have environmental footprint. In the LiveWell study a database was created that linked nutrient composition and GHGE data for 82 food groups, and models were built based on UK diet. The conclusion of the study showed that a sustainable diet that meets dietary requirements for health with lower GHGEs can be achieved without eliminating meat or reducing dairy product consumption. (Source: *Am J Clin Nutr* doi: 10.3945/ajcn.112.038729)


A similar approach has been applied in The Netherlands, with a nutrient calculation model, and the conclusions confirm that consuming less dairy product does not reduce the GHG emission of the diet, because when omitting dairy, which is very nutrient-rich, the nutrients have to be provided by other foods.

When you add up the environmental effects of products that replace dairy, the same carbon emissions and land use are the result. Simply shifting between basic food groups to obtain a more sustainable diet gives disappointing results. (Source: *Dr Stephan Peters, Decreasing the environmental footprint of our diet, Nutrition Magazine.*)

Climate change and emission of greenhouse gases cannot be the sole dimension on which we assess the sustainability of foods. We must also consider the environmental footprint, nutritional value, economy and food culture.



Livestock at the world level use **2 billion ha of grasslands** of which only **700 million** could be used as **cropland**.



**57%** of the land used for **feed production** is **not suitable** for **food production**.

(Source: Mottet, A de Haan, C, Falucci, A et al. (2017).

### Livestock: On our plates or eating at our table?

A new analysis of the feed vs. food debate (source: *Global Food Security, vol.14, p. 1-8*). Researchers from the USDA and Virginia Tech conducted an analysis of the impacts of removing animals from US agriculture and warned that changing one facet of a complex ecosystem has ripple effects and unexpected collateral impact.

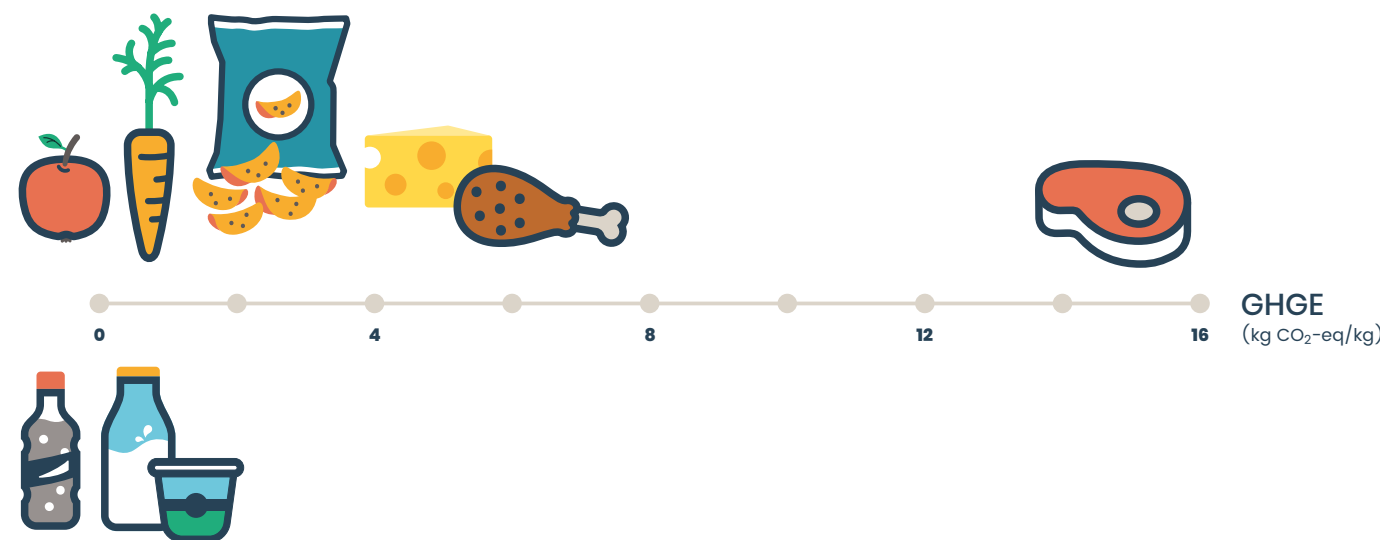
As much of the land in the US is unsuitable for high value crops, the research indicated that over 57 % of the additional food produced would have to come from grains such as corn and soybean. The overall reduction in greenhouse gas emissions was lower than expected at just 2.6 % and given that the plant-only system increased the probability of population deficiencies of calcium, vitamin A, vitamin B12 and important fatty acids, it was not considered a viable option.

A decrease, equivalent to the full GHG attributed by animals, was not realized because of the need to synthesize fertilizers to replace animal manures, dispose of human-inedible byproduct feeds that had been used as feed for animals, and produce additional crops on land previously used by animals. Feeding an entire population solely with plant-based products is thus a very complex scenario, which has been shown to be ineffective as a solution to sustainability challenges. (Source: *White RR, Hall MB. Nutritional and greenhouse gas impacts of removing animals from US agriculture. Proc Natl Acad Sci 2017; 114:E10301-E10308.*)



If we only focus on the environmental and climate impact of the foods, we risk running counter to the human nutritional needs which must also be a key dimension when we measure sustainability. In the context of more holistic dietary guidelines, the health effect of foods as such or dietary patterns is also increasingly taken into account. This goes beyond merely looking at the nutritional value or nutritional composition of foods.

### Plant-based vs. animal foods is too simplistic:



(Source: Darmon)



# Unfolding the Four Dimensions

## 2. Nutritional value

### Nutritional profiling is key

Nutritional value is often measured with the twin concept of energy density and nutrient density of foods, which is measured in kilocalories per 100g and nutrients per 100g or nutrients per 100 kcal.

When looking at nutrient profiling of foods based on kilocalories, fruits and vegetables provide very few calories per serving, whereas milk and dairy products provide more calories per serving. At the other end of the scale with energy dense foods we find grain snacks, sweets and chocolate as well as fats and oils (Drewnowski, 2018).

When we compare this to the measure of carbon footprints, we see that vegetables and fruits were also the group of foods that have the lowest carbon footprint per kg of product. But if these foods do not provide the necessary number of calories or nutrients, they cannot constitute a nutritionally adequate diet by themselves (Drewnowski, 2018).

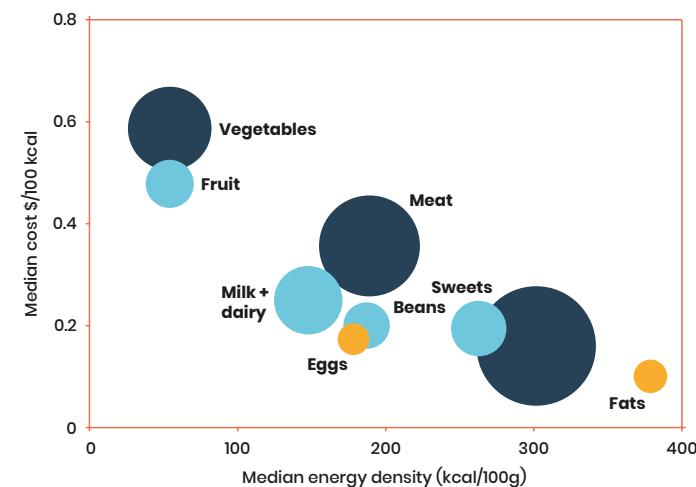
These measures of nutritional value of different food groups demonstrate why it is important to couple the nutritional profiling with the carbon footprint. Moreover, we must also be attentive to the affordability and cultural appropriateness of the different foods.



## 3. Economy

### Empty calories are the cheapest

Empty calories are often cheap whereas more nutrition-rich diets in general are more expensive, current research shows (Drewnowski, 2018). The affordability of food is measured in terms of calories per penny, and by coupling this metric with the nutrient profiling and carbon footprint, we can determine which food is both climate, nutrient and wallet-friendly.



# Unfolding the Four Dimensions

## 4. Food culture

### A sustainable diet must meet the norms

Different cultural, religious, political and social norms shape our views on food. While proteins from insects or green algae may meet a nutritional demand, they have different degrees of sensory or cultural appeal. In our search for the sustainable diet we must take these factors into account as they have major impact on food choices, both regionally and globally.

Selection of dietary sources of protein, in particular, may be determined by religion, society, and culture, in addition to economy. Furthermore, the amount and quality of protein from meat and dairy are higher than can be obtained from any plant foods. As the search for affordable, nutrient-rich foods continues, the social and cultural drivers of food choice need to be addressed too (Drewnowski, 2018).



## Conclusion

### Designing the sustainable diet

In designing a sustainable diet, the quantity consumed, must be taken into consideration first (Source: Masset G. et al, Which functional unit to identify sustainable foods? Public Health Nutrition, 2015).

In fact, the total quantity of food consumed explains a larger part of its greenhouse gas footprint than the carbon intensity of the item itself. Furthermore, if the dairy products are replaced by other items, the CO2 equivalent per calorie of the substituting food item must also be considered (Source: Vieux F. et al, Greenhouse gas emissions of self-selected individual diets in France: Changing the diet structure or consuming less? Ecological Economics, 2012).

A limit to working with complex modelling for a sustainable diet is that models contain only limited environmental data on a limited number of products. This is still an emerging field of research, and the peer reviewed science on the matter is still sparse. There is still an incomplete coverage of relevant environmental areas of concern and associated metrics.

So far the majority of studies take only greenhouse gas emissions into account, ignoring carbon storage under grassland and ecosystem services provided by ruminant production like biodiversity maintenance. It is thus too early to drive any strong conclusions.