Nutritional Adequacy in a Healthy and Sustainable Diet

A role for sustainable livestock production

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Sustainable Diets

- protective and respectful of biodiversity and ecosystems

- culturally acceptable,
- nutritionally adequate
- healthy

FAO, 2011

Sustainable food production and farming

Sustainable Food Processing & Distribution

Sustainable food consumption – healthy, safe and nutritionally adequate

Contributing to lower carbon and sustainable diets

resulting in lower carbon intensity of foods for both domestic and export markets

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Dietary Guidelines, Healthy Eating & Sustainable Diets

- Designed to achieve optimal nutritional health and prevent non-communicable diseases such as obesity, CVD, diabetes
- Now requires an additional layer of planetary health and climate impact of food:

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Dietary Guidelines, Healthy Eating & Sustainable Diets

- Designed to achieve optimal nutritional health and prevent non-communicable diseases such as obesity, CVD, diabetes
- Now requires an additional layer of planetary health and climate impact of food:
  - Removal of an essential food group from the diet can result in nutrient deficiencies and may not be replaced with an equally healthy alternative

Balancing Act I

- Removal of an entire food group such as meat can result in micronutrient deficiencies
  Red meat is an excellent source of protein, iron, zinc, D and B vitamins
  Milk is an excellent source of calcium, B12 and many bioactive compounds
  These nutrients are frequently more bioavailable from animal rather than plant sources

- Vitamin B12 is not naturally found in plant passed foods such as fruit, vegetables and grains

- Hence, these foods are important sources of essential nutrients but also have a higher carbon footprint and are frequently targeted or suggested to be removed from the diet when discussing the climate impact of food production and consumption

Eat Lancet
VS
Food Pyramid

Red meat recommendation = 14g/day

which will provide

0.42mcg B12

Adults require 1.5 mcg/day of vitamin B12

Red meat recommendation = 35g/day

which will provide

1.05mcg B12

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Balancing Act II

Beef Bolognese	Nutrients per portion	Bean Bolognese
155	Energy (kcal)	141
19	Protein (g)	9
4	Fat (g)	2
12	Carbohydrate (g)	24
64	Calcium (mg)	101
3.3	Iron (mg)	3.7
3.8	Zinc (mg)	1.2
0.4	Vitamin D (ug)	0.0
0.6	Vitamin B6 (mg)	0.4
1.5	Vitamin B12 (ug)	0.0
3	Kg CO_2 per portion	0.6

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Balancing Act III

Protein & Calcium

400g of CO2
130 kcals
7g protein
9.5 g CHO
7g fat
1.9mcg B12
247mg Calcium

400g of CO2
84 kcals
0g protein
21.2 g CHO
0 g fat
0 mg B12
0 mg Calcium

Sugar

Food Consumption patterns & associated carbon footprint of Irish diets

International Journal of Food Science +Technology

International Journal of Food Science and Technology 2017

Original article

Dietary emissions patterns and their effect on the overall climatic impact of food consumption

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Summary Food consumption is responsible for a considerable proportion of greenhouse gas emissions (GHGE). This study aimed to determine whether different dietary emission patterns (EPs) are evident in the Irish population. Respondents of the national nutritional survey were segmented using cluster analysis based on GHGE generated from food groups; thereby profiling similarities in how emissions were attained. Three distinct EPs were observed: Unsustainable, Culturally Sustainable, and Nutritionally Sustainable. The Unsustainable pattern had a significantly greater climatic impact; generating significantly higher emissions from processed meat, alcohol, carbonated beverages and savoury snacks, but significantly lower emissions from dairy.Total GHGE did not differ significantly between the Culturally Sustainable and the Nutritionally Sustainable despite the latter deriving significantly lower emissions from red meat. Nevertheless, the Nutritionally Sustainable pattern adhered to more dietary guidelines than other EPs. The results imply that policy instruments should be holistic in naturerather than concentrating on individual food groups.

Keywords Food consumption, GHGE dietary patterns, Irish adults, Sustainable diets.

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Summary

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Unsustainable patter nifi
from processed meat, alco ol, carb
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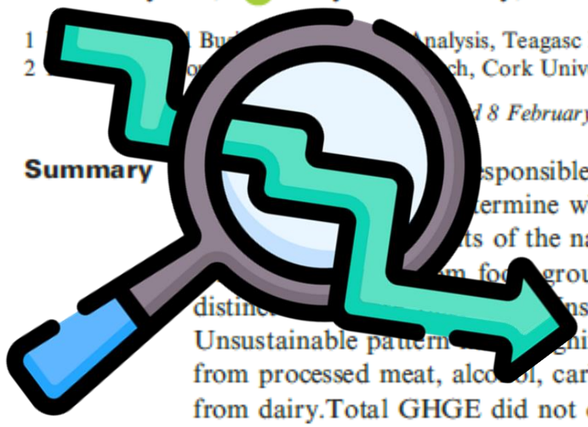

- Distinguishing food groups:
  - Processed meat
  - Savoury snacks
  - Alcohol

Unsustainable 25%

- Distinguishing food groups:
  - Fruit & veg
  - Fish
  - Low red meat
  - Dairy

Nutritionally Sustainable 26%

- Distinguishing food groups:
  - Red meat
  - Dairy
  - Starchy staples

Culturally Sustainable 48%

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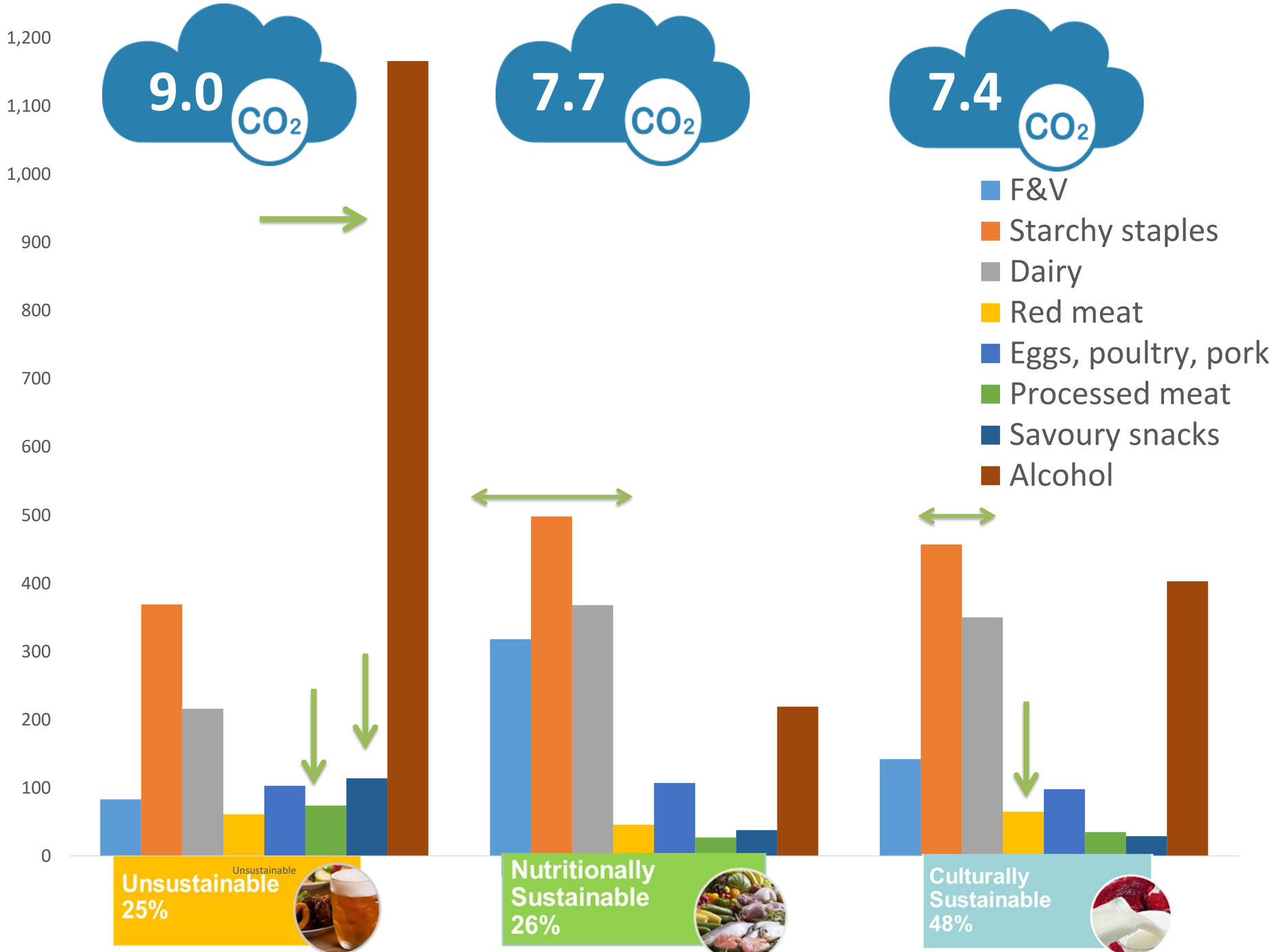
Carbon footprint of Irish diets



Low carbon diets with the removal of meat results in inadequate nutrient intakes

The American Journal of CLINICAL NUTRITION

journal homepage: https://ajcn.nutrition.org/

Original Research Article

Impact of consuming an environmentally protective diet on micronutrients: a systematic literature review

Ursula M Leonard [1], Clarissa L Leydon [2,3], Elena Arranz [1,4], Mairead E Kiely [1,*]

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Teagasc Food Research Centre, Ashtown, Dublin, Ireland; [4] Department of Nutrition and Food Science, Faculty of Pharmacy, Complutense Uni
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ABSTRACT

Background: A global move toward consumpti… planetary health. As t
result in greater reliance on plant-based protein sources… tus is unknown.
Objective: Evaluate the evidence of effects on intakes… in dietary intakes
impact. Selected MNs of public health concern were vi… nd zinc.
Methods: We systematically searched 7 databases from Januar… RISMA guideline
report individual MN intake and/or status data collected in free… d and environme
Results: From the 10,965 studies identified, 56 studies were inclu… = 49). Iron (all 56)
the most and least reported MNs, respectively. There was one ran… rovided the only b
intake studies, and 45 dietary modeling studies, including 29 d… t to reduce greenhous
of animal-sourced foods. Most results suggested that int… A, and …ould dec
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Conclusions: Lower intakes and status … health concern are a potential outcome of dietary ch… to reduce environmental impacts.
Adequate consideration of context and nu… quirements is required to develop evidence-based recommendations.
This study was registered prospectively with … SPERO (CRD42021239713).

- Reduced intake of animal-sourced foods.
- Intakes of zinc, calcium, iodine, and vitamins B12, A, and D would decrease
- Total iron and folate would increase in a dietary transition to reduce environmental impacts.
- Risk of inadequate intakes of zinc, calcium, vitamins A, B12 and D were more likely to increase

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ABSTRACT

Background: A global move toward consumption of diets from sustainable sources is required to protect planetary health. As this dietary transition will result in greater reliance on plant-based protein sources, the impact on micronutrient (MN) intakes and status is unknown.

Objective: Evaluate the evidence of effects on intakes and status of selected MNs resulting from changes in dietary intakes to reduce environmental impact. Selected MNs of public health concern were vitamins A, D, and B12, folate, calcium, iron, iodine, and zinc.

Methods: We systematically searched 7 databases from January 2011 to October 2022 and followed the PRISMA guidelines. Eligible studies had to report individual MN intake and/or status data collected in free-living individuals from the year 2000 onward and environmental outcomes.

Results: From the 10,965 studies identified, 56 studies were included, mostly from high-income countries (n = 49). Iron (all 56) and iodine (n = 20) were the most and least reported MNs, respectively. There was one randomized controlled trial (RCT) that also provided the only biomarker data, 10 dietary intake studies, and 45 dietary modeling studies, including 29 diet optimization studies. Most studies sought to reduce greenhouse gas emissions or intake of animal-sourced foods. Most results suggested that intakes of zinc, calcium, iodine, and vitamins B12, A, and D would decrease, and total iron and folate would increase in a dietary transition to reduce environmental impacts. Risk of inadequate intakes of zinc, calcium, vitamins A, B12 and D were more likely to increase in the 10 studies that reported nutrient adequacy. Diet optimization (n = 29) demonstrated that meeting nutritional and environmental targets is technically feasible, although acceptability is not guaranteed.

Conclusions: Lower intakes and status of MNs of public health concern are a potential outcome of dietary changes to reduce environmental impacts. Adequate consideration of context and nutritional requirements is required to develop evidence-based recommendations.
This study was registered prospectively with PROSPERO (CRD42021239713).

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Life-stages & Nutrient Adequacy

Pre-conception and pregnancy

Increased requirement folic acid, iron, calcium, and vitamin D

Infancy

Rapid growth period. A balance of nutrients is essential and Ca, Iron, protein are of particular importance

Childhood

High nutritional requirements relative to body size therefore quality is important

Adolescence

Iron and calcium peak bone mass

Older age

Cogitative and muscle maintenance, nutrient density, frailty prevention
Protein, zinc, B12, vitamin D

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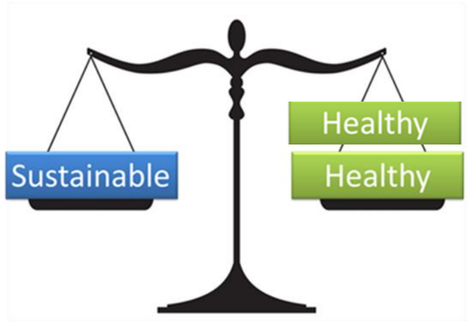
Life-stages & Nutrient Adequacy



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risk of malnutrition in children on restrictive diets is high

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Conclusions

01

Holistic approach

A sustainable diet starts with production of every food

02

Dietary carbon footprint

Can be achieved consuming all foods in correct proportions

03

Meat & Dairy

essential foods in a sustainable and nutritionally adequate diet

04

Nutrient density

Importance across life stages

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THANK YOU

SuHe Guide | Sustainable Healthy Dietary Guidelines

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