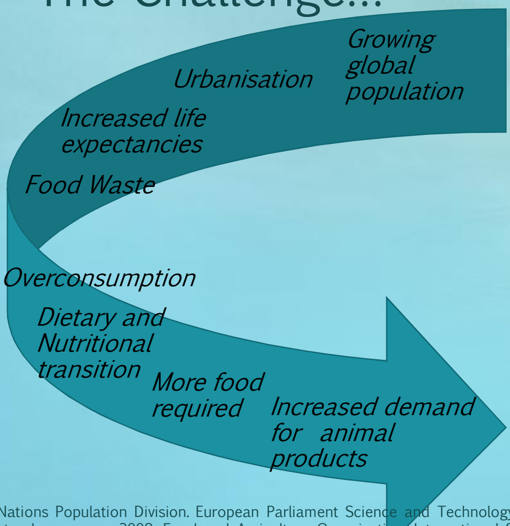
Sustainable Diets in Practice

Lynne Garton BSc (Hons) RD
Consultant Dietitian
www.alimenta.co.uk
@dietlg

Outline…

- The Challenge
- Defining a Sustainable Diet
- Sustainable Eating in Practice
- Conclusions

The Challenge…



Environmental Implications

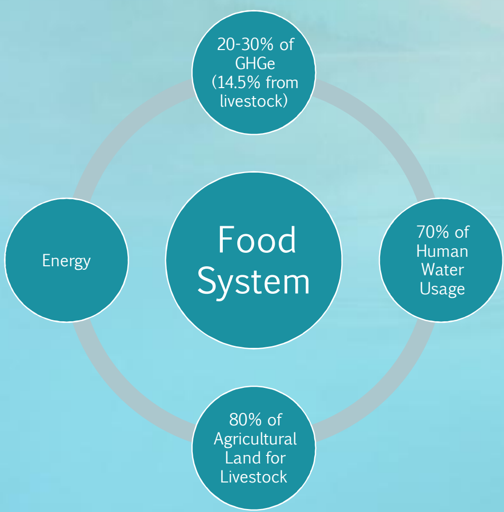
- **Climate change**
- **Drain on natural resources**
- **Decline in food yields**

Health Implications

- **Escalating obesity rates**
- **Increase in NCD**

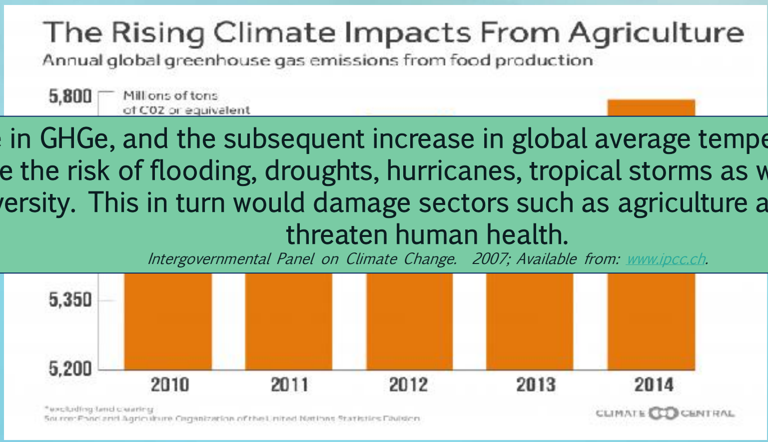
FAO, United Nations Population Division. European Parliament Science and Technology Options Assessment, Implications of global trends in eating habits for climate change, health and natural resources. 2008. Food and Agriculture Organization, International Scientific Symposium.
Biodiversity and sustainable diets - united against hunger. 2010, Food and Agriculture Organization of the United Nations: Rome.
Popkin BM. *Am J Clin Nutr* (2006) 84:289-98. Popkin BM, Adair LS, Ng SW. *Nutr Rev* (2012) 70:3-21. World Health Organization. Global Status Report on Non-Communicable Diseases 2014. Geneva: World Health Organization (2014). World Health Organization. Global Status Report on Non-Communicable Diseases 2014. Geneva: World Health Organization (2014)

Environmental Impact of the Food System…



Vermeulen SJ, Campbell BM, Ingram JIS. *Annu Rev Environ Resour.* (2012);37:195–222. Stehfest E, Bouwman L, van Vuuren D, den Elzen M, Eickhout B, Kabat P. *Clim Change* (2009) 95:83–102. Steinfeld H, Gerber P, Wassenaar T, Castel V, Rosales M, de Haan C. FAO (2013). Tackling Climate Change though Livestock - A global assessment of emissions and mitigation opportunities.. Tukker A, Goldbohm A, de Koning A, Verheijden M, Kleijn R, Wolf O, et al. *Ecol Econ* (2011) 70:1776–88.

GHGe Over Time…



A rise in GHGe, and the subsequent increase in global average temperature would increase the risk of flooding, droughts, hurricanes, tropical storms as well as a loss in biodiversity. This in turn would damage sectors such as agriculture and ultimately threaten human health.

Intergovernmental Panel on Climate Change. 2007; Available from: www.ipcc.ch.

Source: FAO Stats Division

Business as Usual is NOT the Answer…

- Globally if we carry on as we are…
  - We will need to produce more food by 2050 than we have done in human history
  - This will require 120% more water; 42% more cropland and loss of 14% more forest
  - global warming
  - We'll lose much of the world's biodiversity
- Improvements in technology to improve yields will not be sufficient to meet targets set for the reduction in GHGE
- To achieve these targets, dietary intakes will need to change

BUT… What needs to change?

Bajzelj B, et al. *Nature Climate Change* (2014) 4: 924-929, Hedenus F, Wirsenius S, Johansson DJA. *Climatic Change* (2014);124:79-91

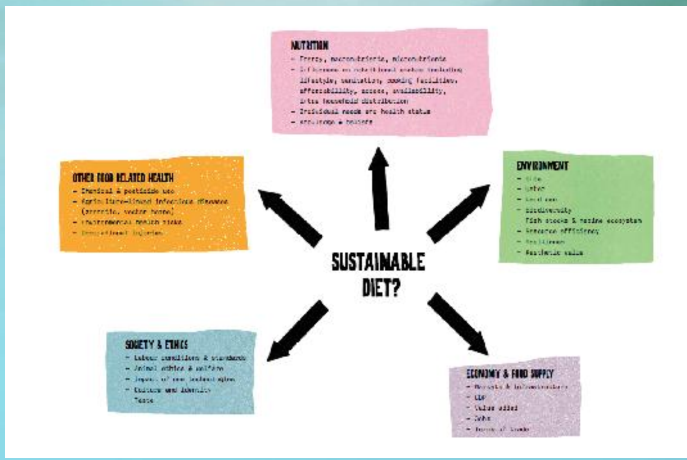
What is a Sustainable Diet…

The FAO defined sustainable diets as:

'*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…'

International Scientific Symposium Biodiversity and Sustainable Diets United Against Hunger. 3-5 November 2010, FAO Headquarters, Roma and 2012 FAO report

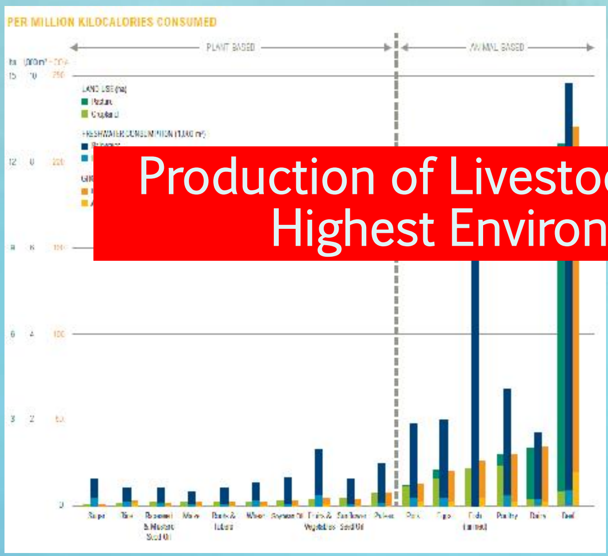


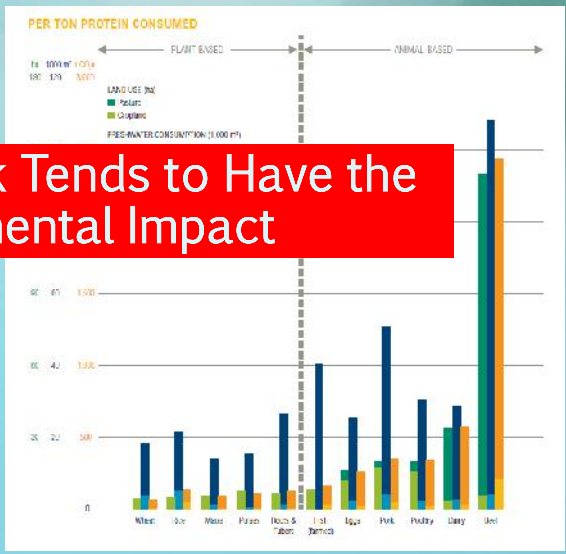
Extracted from: What is a sustainable healthy diet? A discussion paper. Tara Garnett, Food Climate Research Network, April 2014 http://www.fcrn.org.uk/sites/default/files/fcrn_what_is_a_sustainable_healthy_diet_final.pdf (accessed April 2017).

Assessing the Impact of Foods/ Eating Patterns on the Environment and Health…

3. Modelling Scenarios
2. Dietary Patterns
1. Individual Foods

1) Environmental Impact of Different Foods…

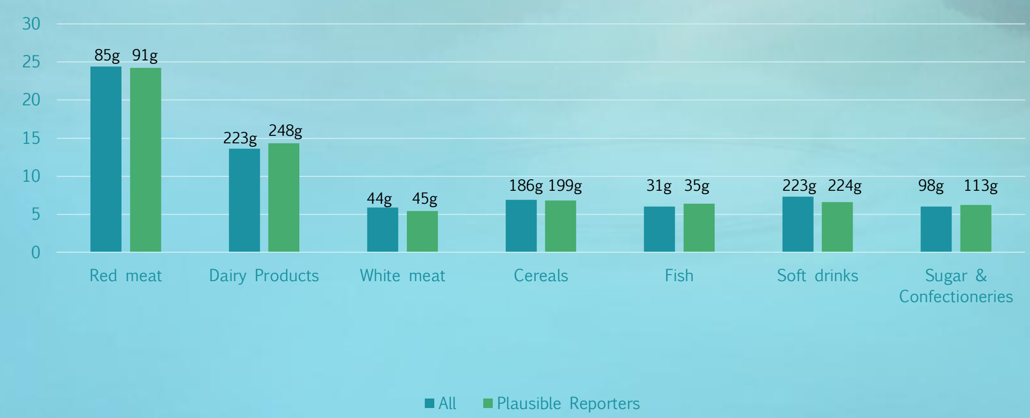




Production of Livestock Tends to Have the Highest Environmental Impact

Extracted from: Ranganathan, J. et al. 2016. "Shifting Diets for a Sustainable Food Future." Working Paper, Installment 11 of Creating a Sustainable Food Future. Washington, DC: World Resources Institute. Accessible at http://www.worldresourcesreport.org.

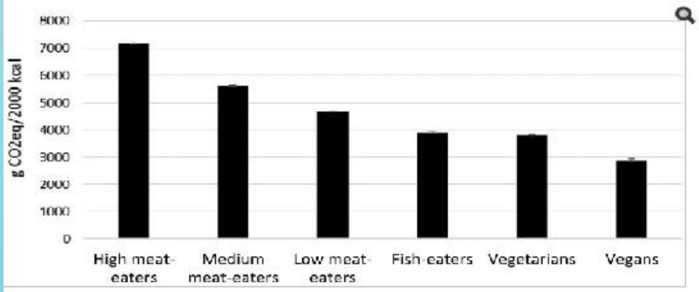
Percentage Contribution of Food Groups to Diet Related GHGe in the UK…



Murakami and Livingstone. Nutrition Journal (2018) 17:27

2) Environmental Impact of Different Dietary Patterns…

Dietary greenhouse gas emissions of meat-eaters, fish-eaters, vegetarians and vegans in the UK…



Mean dietary GHGEs per 2000 kcal for high meat-eaters (≥100 g/d; n=8286), medium meat-eaters (50–99 g/d; n=11971), low meat-eaters (>0 and<50 g/d; n=9332), fish-eaters (n=8123), vegetarians (n=15 751), and vegans (n=2041) in the United Kingdom. Adapted with permission from Scarborough et al.[39] *Abbreviations:* CO_2e, carbon dioxide equivalents; GHGEs, greenhouse gas emissions

P Scarborough , P Appleby , A Mizdrak et al. (2014). Climatic Change 125, 179–192.

A Systematic Review of the Impact of Dietary Changes on Environmental Footprints…

Description of the number of reviewed scenarios, by type of sustainable dietary pattern and environmental indicator.

Sustainable diet type	Environmental impact		
	GHG emissions	Land use	Water use
Vegan	14	6	1
Vegetarian	20	7	9
Ruminants replaced by monogastric meat	6	3	1
Ruminants replaced by monogastric + no dairy	1	-	-
Meat partially replaced by plant-based food	8	4	-
Meat partially replaced by dairy products	3	1	-
Meat partially replaced by mixed food	7	1	-
Meat + dairy partially replaced by plant-based food	5	3	3
Balanced energy intake	6	2	1
Healthy guidelines	21	10	9
Healthy guidelines + further optimisation	16	5	4
Mediterranean	8	5	4
New Nordic Diet	3	1	-
Pescatarian	6	4	2
Total	124	52	34

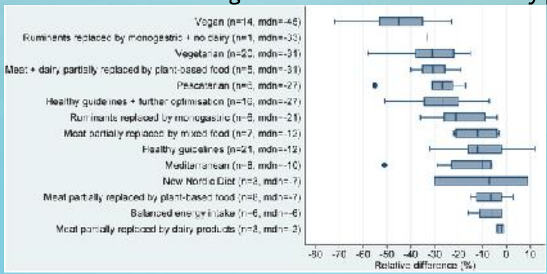
doi:10.1371/journal.pone.0165797.t001

63 studies
210 scenarios

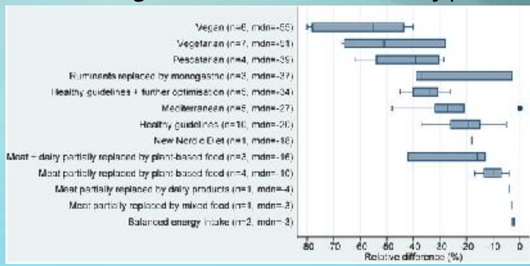
Aleksandrowicz L, Green R, Joy EJM, Smith P, Haines A (2016). PLOS ONE 11(11): e0165797. doi:10.1371/journal.pone.0165797
http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0165797

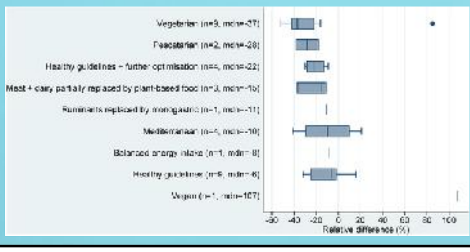
A Systematic Review of the Impact of Dietary Changes on Environmental Footprints…

Relative differences in GHG emissions (kg CO2eq/capita/year) between current average diets and sustainable dietary patterns.



Relative differences in land use (m2/capita/year) between current average diets and sustainable dietary patterns.





Relative differences in water use (L/capita/day) between current average diets and sustainable dietary patterns.

Aleksandrowicz L, Green R, Joy EJM, Smith P, Haines A (2016) PLOS ONE 11(11): e0165797. doi:10.1371/journal.pone.0165797
http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0165797

Benefits of Sustainable Eating Patterns on Health…

Study		Country	Sustainable diet type	Health indicator	Change in health indicator (95% CI)*
Sabate 2015	74	US/Canada	Vegan	All-cause mortality rate	15.2%
Soret 2014	50	US/Canada	Vegetarian	All-cause mortality risk	9% (0–17)
Tilman 2014	8	Globally	Vegetarian	All-cause mortality risk	<1% (0–2)**
Sabate 2015	74	US	Vegetarian	All-cause mortality rate	15.9%
Aston 2012	21	UK	Meat partially replaced by mixedfood	CHD risk (men)	9.7% (-3.5–22)
Aston 2012	21	UK	Meat partially replaced by mixedfood	CHD risk (women)	6.1% (-1.8–14.3)
Aston 2012	21	UK	Meat partially replaced by mixedfood	Diabetes mellitus risk (men)	12% (-4.5–22.7)
Aston 2012	21	UK	Meat partially replaced by mixedfood	Diabetes mellitus risk (women)	7.3% (0.5–14.5)
Aston 2012	21	UK	Meat partially replaced by mixedfood	Colorectal cancer risk (men)	12.2% (6.4–18.0)
Aston 2012	21	UK	Meat partially replaced by mixedfood	Colorectal cancer risk (women)	7.7% (4.0–11.3)
Soret 2014	50	US/Canada	Meat partially replaced by mixedfood	All-cause mortality risk	14% (4–23)
Sabate 2015	74	US/Canada	Meat partially replaced by mixedfood	All-cause mortality rate	7.2%
Biesbroek 2014	25	Netherlands	Meat partially replaced by plant-based food	All-cause mortality risk	10% (3–16)
Biesbroek 2014	25	Netherlands	Meat partially replaced by dairy	All-cause mortality risk	6% (-4-14)
Tilman 2014	8	Globally	Meciterranean	All-cause mortality risk	18% (17–19)
Sabate 2015	74	US/Canada	Pescatarian	All-cause mortality rate	17.6%
Milner 2015	79	UK	Healthy guidelines	Years of life lost⁺	6%
Milner 2015	79	UK	Healthy guidelines + further optimisation	Years of life lost⁺	7%
Scarborough 2012	80	UK	Meat, dairy partially replaced by plant-based fooc	Deaths averted	6%
Scarborough 2012	80	UK	Ruminants replaced by monogastric	Deaths averted	<1%

*Percentages refer to reductions in health indicators, except for deaths averted

**Mortality risk reduction by cause: cancer 10%, coronary heart disease 20% type 2 diabetes 42%

⁺Years of life lost, at year 30 (after adoption of the sustainable diet scenario)

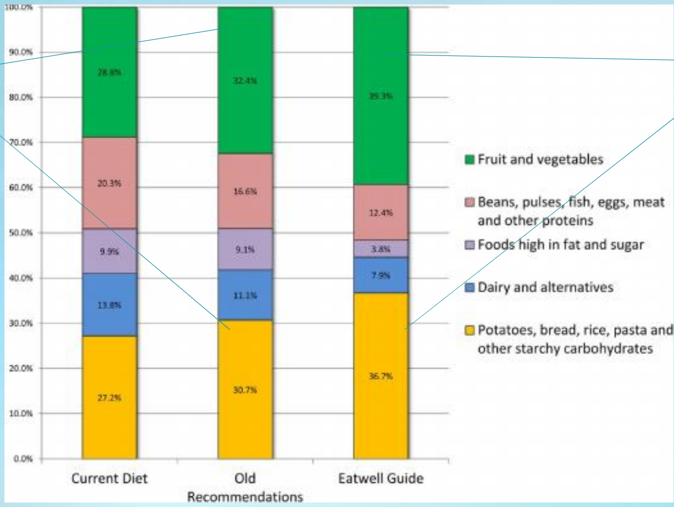
doi:10.1371/journal.pone.0165797.t002

Aleksandrowicz L, Green R, Joy EJM, Smith P, Haines A (2016). PLOS ONE 11(11): e0165797. doi:10.1371/journal.pone.0165797
http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0165797

3. Modelling studies…Eatwell Guide

Breakdown of the diet by Eatwell Guide categories for current consumption, the 'Eatwell Guide' scenario and the 'old recommendations' scenario.

Plant Foods = 63%



Plant Foods = 76%

Scarborough P, Kaur A, Cobiac L, et al Eatwell Guide: modelling the dietary and cost implications of incorporating new sugar and fibre guidelines *BMJ Open* (2016);6:e013182. doi: 10.1136/bmjopen-2016-013182

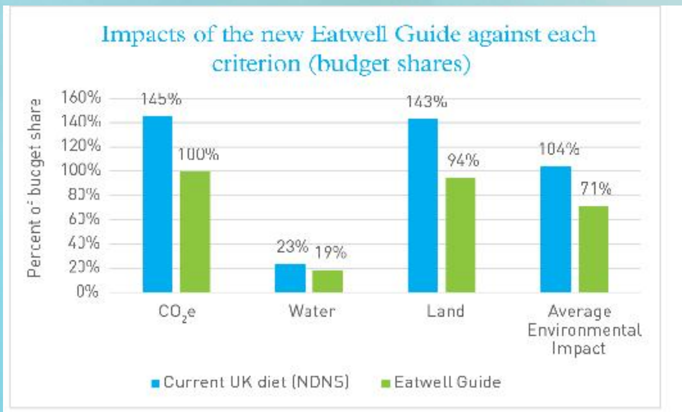
Modelled Quantities of Foods…

Food Groups	Current Consumption (g/ day)	Old Recommendations (g/ day)	New Eatwell Guide Recommendations (g/ day)
Fruit & Vegetable			26
Potatoes, bread, and other starchy carbohydrates			73
Dairy & Alternati			3
Beans, pulses, fis meat and other p • Red meat • Processed meat • White Meat • Beans, pulses and other legumes • Nuts	 14 2.7	 25 6.1	0 26 2.6
Foods high in fat and sugar	216	213	103
PRICE	£6.02	£5.81	£5.99

Eatwell Guide scenario requires 'fruit and vegetable' consumption to increase by 54%, 'starchy foods' to increase by 68%, 'beans, pulses, fish, eggs, meat and other proteins' to fall by 24% and 'dairy and alternatives' to fall by 21% compared to current consumption.

Scarborough P, Kaur A, Cobiac L, et al Eatwell Guide: modelling the dietary and cost implications of incorporating new sugar and fibre guidelines *BMJ Open* (2016);6:e013182. doi: 10.1136/bmjopen-2016-013182

Environmental Impact of the Eatwell Guide…



Carbon Trust, The Eatwell Guide: a more sustainable diet report (2016), https://www.carbontrust.com/media/672635/phe-sustainable-diets.pdf

Conclusions from Studies Examining the Impact of Diet on the Environment…

- Generally, studies have found that the plant foods and plant-based dietary patterns are associated with the lowest environmental impact, while the intake of meat, fish, and animal products, including dairy foods, is generally correlated with high emissions of greenhouse gases

Dietary Considerations…

Change in Dietary Patterns

Plant-based Eating

Reduce Food Waste

- Portion Control
- Use by vs Best Before
- Planning
- Tips for left overs

Eat according to calorie requirements

- Portion Control
- Balanced Diet

Shifting towards Plant-Based Eating…

Plant-based

Semi–vegetarians/ Flexitarians

Pescetarians

Lacto-ovo vegetarians

Lacto-vegetarians

Vegan

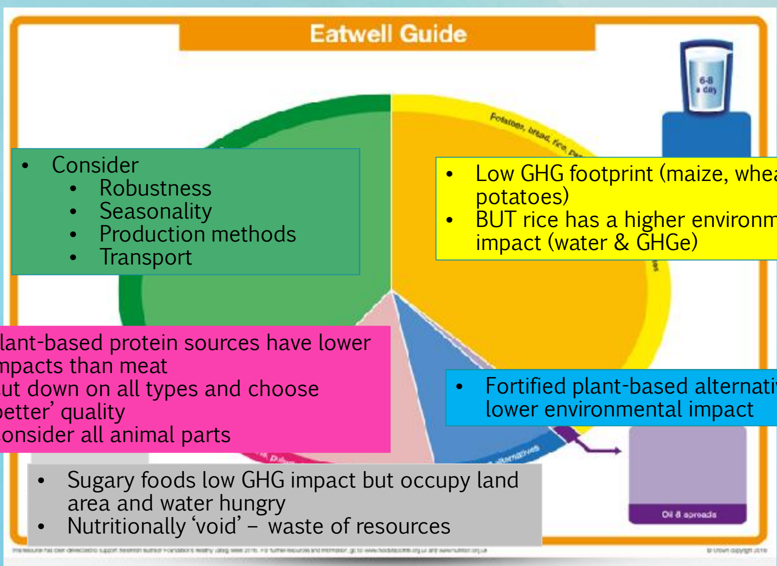
Plant-Based Eating

Plant-based…
putting plant foods at the core of the diet

Sustainable Eating in Practice…

Step 1	Step 2	Step 3
 Follow the Eatwell Guide Principles	Eat more sustainable options within each food group	Shifting along the plant-based spectrum

Step 2: Choose more Sustainable Options…



- Consider
  - Robustness
  - Seasonality
  - Production methods
  - Transport

- Low GHG footprint (maize, wheat and potatoes)
- BUT rice has a higher environmental impact (water & GHGe)

- Plant-based protein sources have lower impacts than meat
- Cut down on all types and choose 'better' quality
- Consider all animal parts

- Fortified plant-based alternatives have a lower environmental impact

- Sugary foods low GHG impact but occupy land area and water hungry
- Nutritionally 'void' – waste of resources

Step 3: Shifting along the Plant-based Eating Spectrum…

Reduction in animal foods, increased reliance on plant foods

- Nutritional Considerations
- Swapping for nutritionally suitable alternatives
- Bust those myths

In Summary… Principles of a Healthy Sustainable Diet…

Eat a balanced diet, including a wide variety of foods, to maintain a healthy weight

More plant-based foods

Less animal foods

Buy better

Eat fewer foods high in fat, salt and sugar

Waste less food

Drink tap water in preference to other beverages

Eat at least 2 portions of fish a week