

# Researching sustainable diets – data needs

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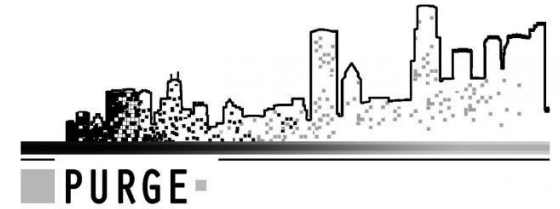
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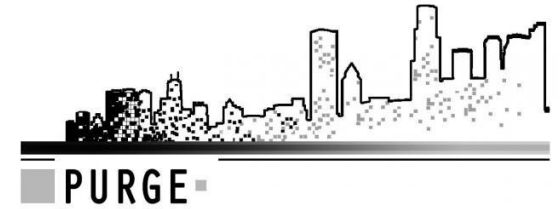
# Sustainable diets in the UK



- Average UK diets are unhealthy
  - ^ saturated fat, sugar and salt
  - √ fruit and veg
- They are also high in greenhouse gas emissions
  - UK has committed to reduce these by 80% by 2050 from 1990 levels
  - Around 30% of GHG emissions are from the food industry
  - Most GHG emissions from food come from animal products (especially ruminants) and to some extent from processed foods
- It may be possible to improve health and environmental impacts by modifying diets



# Data sources (1)



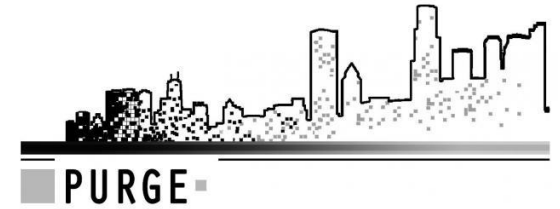
- *Dietary data*
  - National Diet and Nutrition Survey (NDNS) – UK representative
  - Rolling programme of cross-sectional surveys of adults and children, approx. 1,600 people per year
  - Data available from 2008-2011
  - Food consumption (4-day diary), physical measurements, urine and blood samples and socio-demographic data
  - Matched to data from UK Food Composition Tables to give nutritional content (40 food groups)
  - Gives us UK average food and nutrient intakes



# Nutritional content of UK diets (from NDNS 2008-11)

Nutrient	WHO guideline	Current male diet	Current female diet
Total fat (% energy)	15-30	33	34
Saturated fat (% energy)	<10	12	13
Polyunsaturated fat (% energy)	6-10	5.8	5.1
Trans fats (% energy)	<1	0.7	0.7
Carbohydrates (% energy)	55-75	44	46
Free sugars (% energy)	<10	12	11
Protein (% energy)	10-15	16	17
Sodium (g)	<2	2.6	1.9
Fruit and vegetables (g)	≥400	285	288

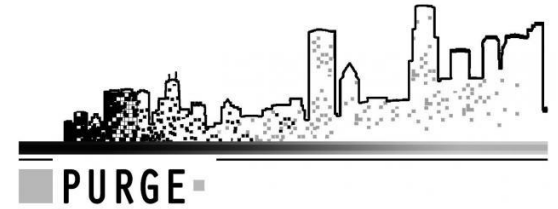
# Data sources (2)



- *Environmental data*
  - Information on the mean greenhouse gas (GHG) emissions produced by each food eaten in the NDNS (per g)
  - From Life Cycle Analysis (LCA) – complete assessment of GHGs produced at each stage, from farm production to transport, packaging, processing and waste
  - Obtained from various sources (UK specific where possible)
  - Extrapolation from other countries and food groups where data were not available
  - Produced an estimate of GHG emissions per g for each of the 40 food groups taken from NDNS

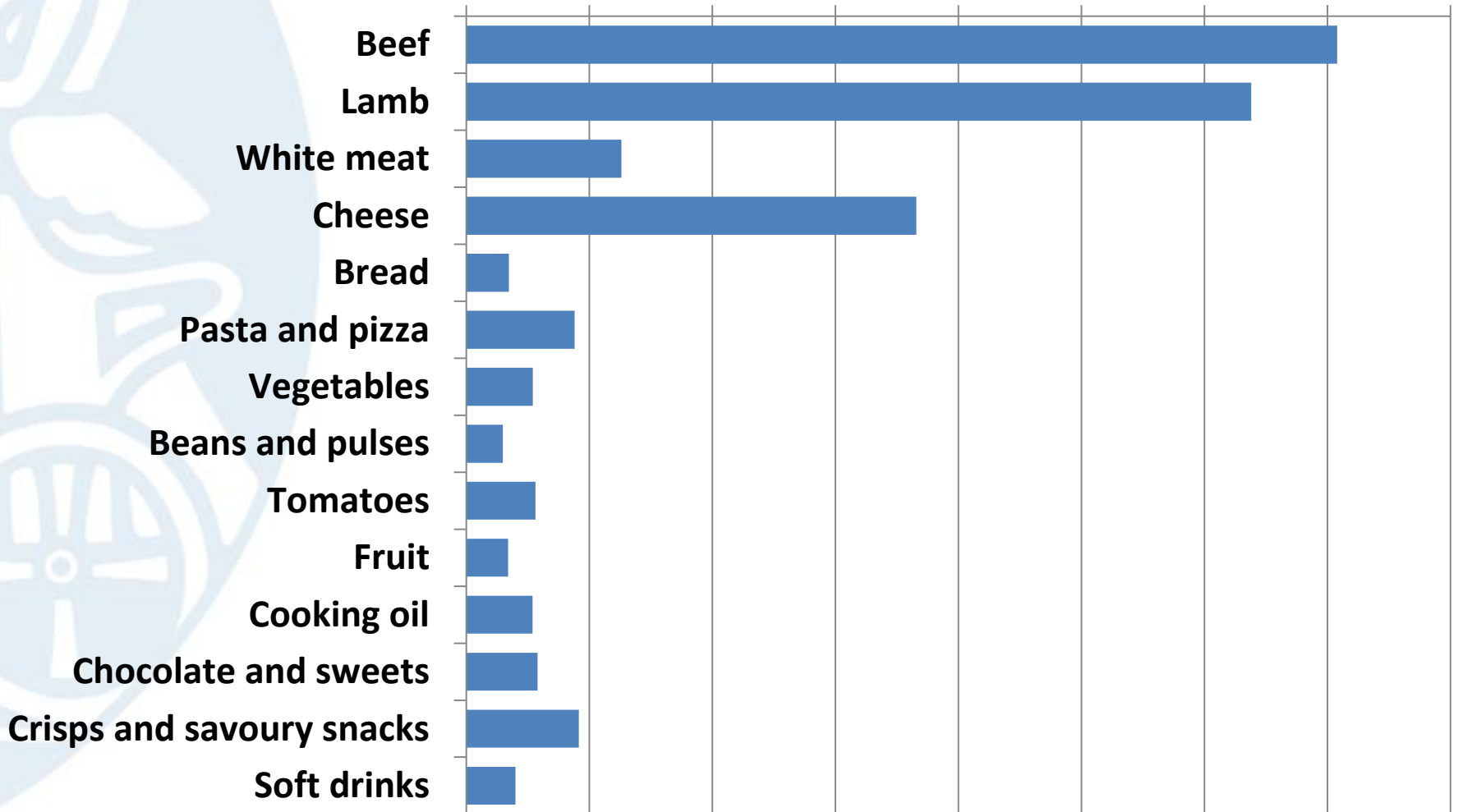


# UK GHGs from food

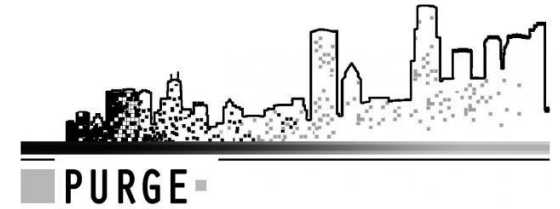


Greenhouse gas emissions in kg CO<sub>2</sub> equivalent per kg

0 5 10 15 20 25 30 35 40



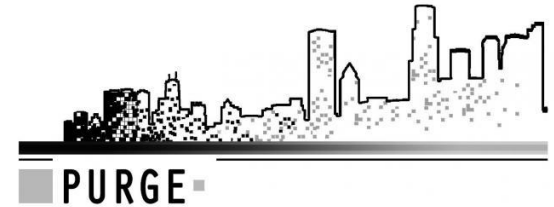
# Data sources (3)



- *Health outcome data*
  - RRs taken from published meta-analyses for food-disease relationships (e.g. Processed meat and colorectal cancer, fruit/veg and CHD) – Global Burden of Disease study and World Cancer Research Fund
  - UK mortality rates taken from ONS data
  - Used life tables to calculate changes in age-specific mortality rates associated with consumption changes
  - Also looked at changes in morbidity and used these to calculate QALYs (combined measure of mortality and morbidity)



# Methods – dietary optimisation



## OLD DIET

Meat

Dairy

Sugar

Cereals

Fats

Fruit and  
vegetables

## FUNCTION

Minimise  
deviation  
from current  
diet

## CONSTRAINTS

Total fat must be 15-30% of diet

>400g fruit and vegetables per day

<2g sodium per day

Protein must be 10-15% of diet

Carbohydrate must be 55-75% of diet

Limit on greenhouse gas emissions

## NEW DIET

Meat

Dairy

Sugar

Cereals

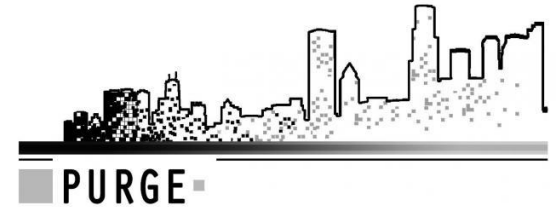
Fats

Fruit and  
vegetables





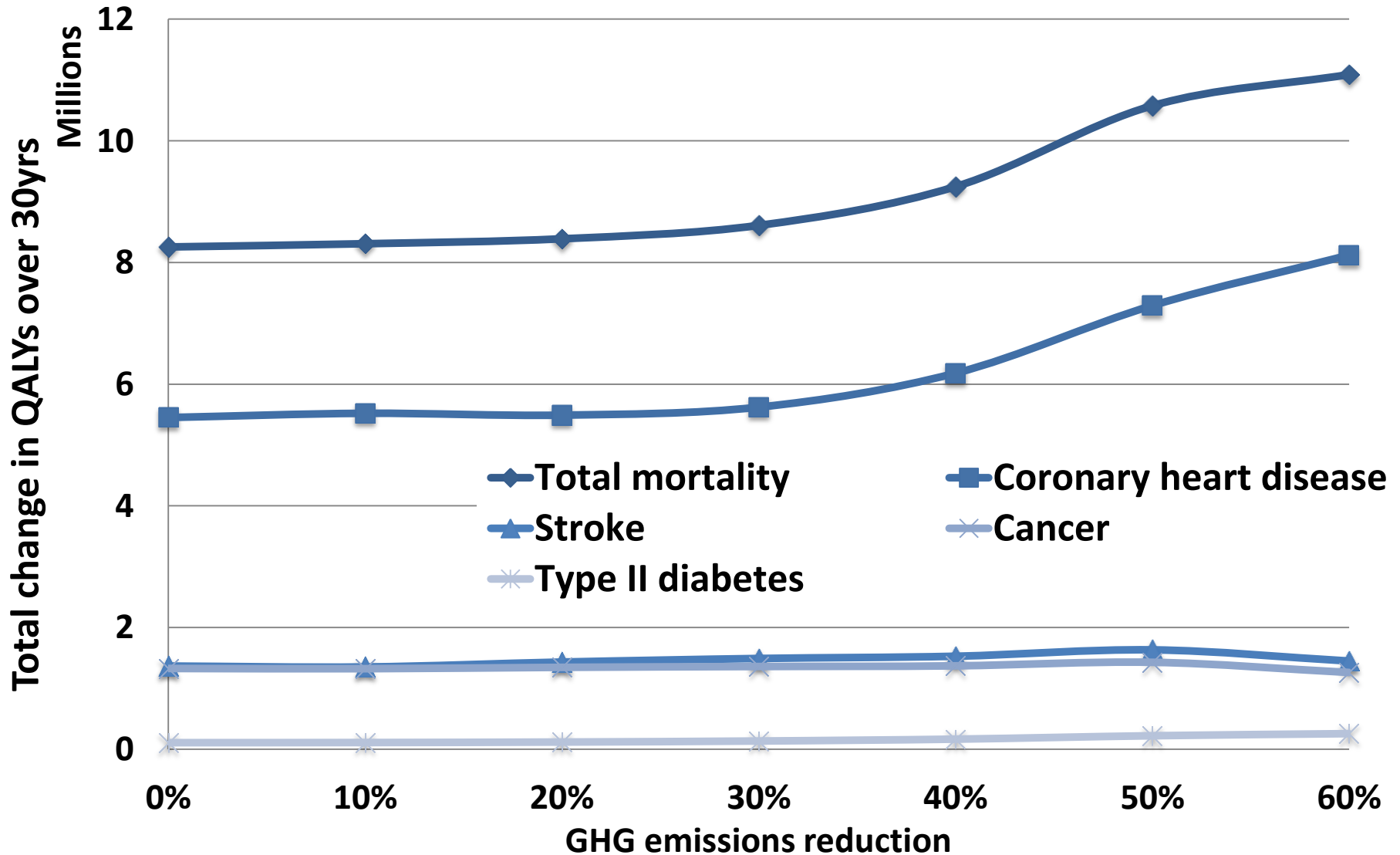
# Results



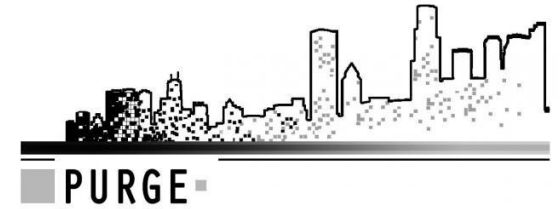
- Optimising the diet just for health (complying with WHO recommendations) also resulted in a 17% reduction in GHG emissions
- Main changes were reduction in meat, dairy and sugary drinks, and increase in cereals, fruit and veg
- Further models showed that a reduction of up to 40% in GHG emissions could be achieved without huge dietary changes (e.g. veganism)
- Beyond a 40% reduction the diet only barely met WHO recommendations and required much bigger dietary changes



# Health impacts (QALYs)



# Data gaps and limitations (1)

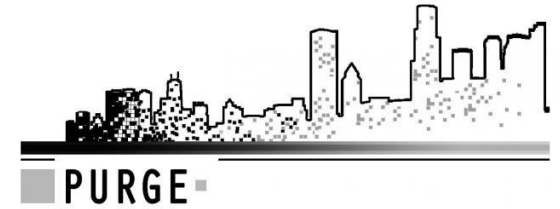


## *Environmental impacts of diets:*

- Recent and ideally longitudinal data on consumption will help us make more accurate estimates of people's current nutritional intake
- No integrated data sources on food consumption and environmental impacts – need to be pieced together
- Routine data on environmental footprints of foods would help, e.g. LCA data as well as nutritional data available for all foods
- No measures of uncertainty in nutritional content or environmental impacts of foods – makes modelling difficult



# Data gaps and limitations (2)

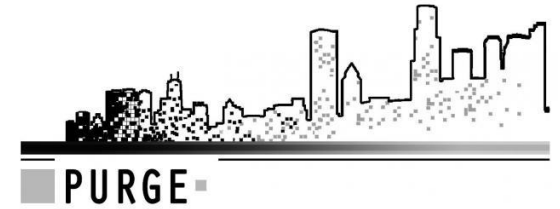


*Broader research on sustainable diets:*

- Very difficult to find other measures of environmental impact of foods apart from GHGs – what about water use etc?
- How does the food system fit in? We need to be able to vary estimates of sustainability by production methods, country of production etc.
- Need to combine data on food production (e.g. how this will change with temperature / rainfall changes) with data on food consumption (how might this change nutrition and health)



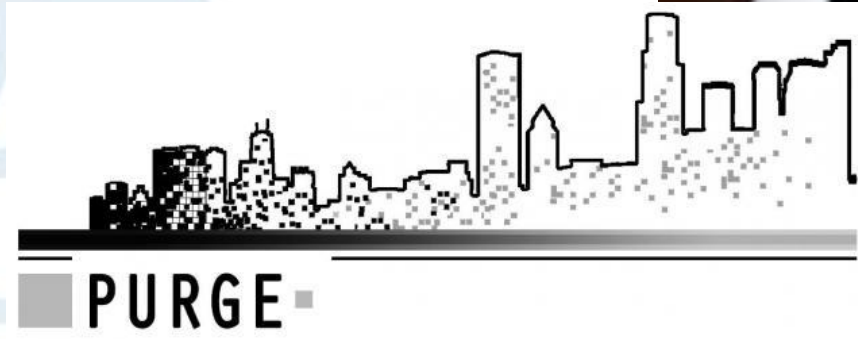
# What could we do with better data?



- Produce much more accurate estimates of the environmental impacts of diets in the UK
- Produce estimates of how diets are changing over time and the impacts of this on the environment
- Produce better estimates of real sustainability of diets – not just impacts of foods on environment but resilience to climate change etc.
- Provide opportunities for proper joined-up policy making between agriculture e, environment and health



# Thanks for your attention!

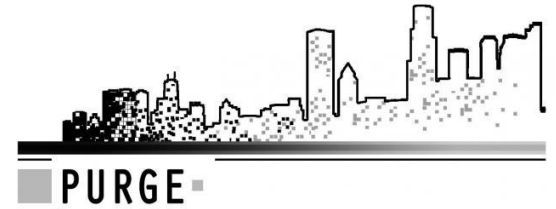


## Further details:

- Green R, Milner J, Dangour AD, Haines A, Chalabi Z, Markandya A, Spadaro J and Wilkinson P (2015) **The potential to reduce greenhouse gas emissions in the UK through healthy and realistic dietary change.** *Climatic Change* doi: 10.1007/s10584-015-1329-y.
- Milner J, Green R, Dangour AD, Haines A, Chalabi Z, Spadaro J, Markandya A and Wilkinson P (2015) **Health effects of adopting low greenhouse gas emission diets in the UK.** *BMJ Open* doi: 10.1136/bmjopen-2014-007364.



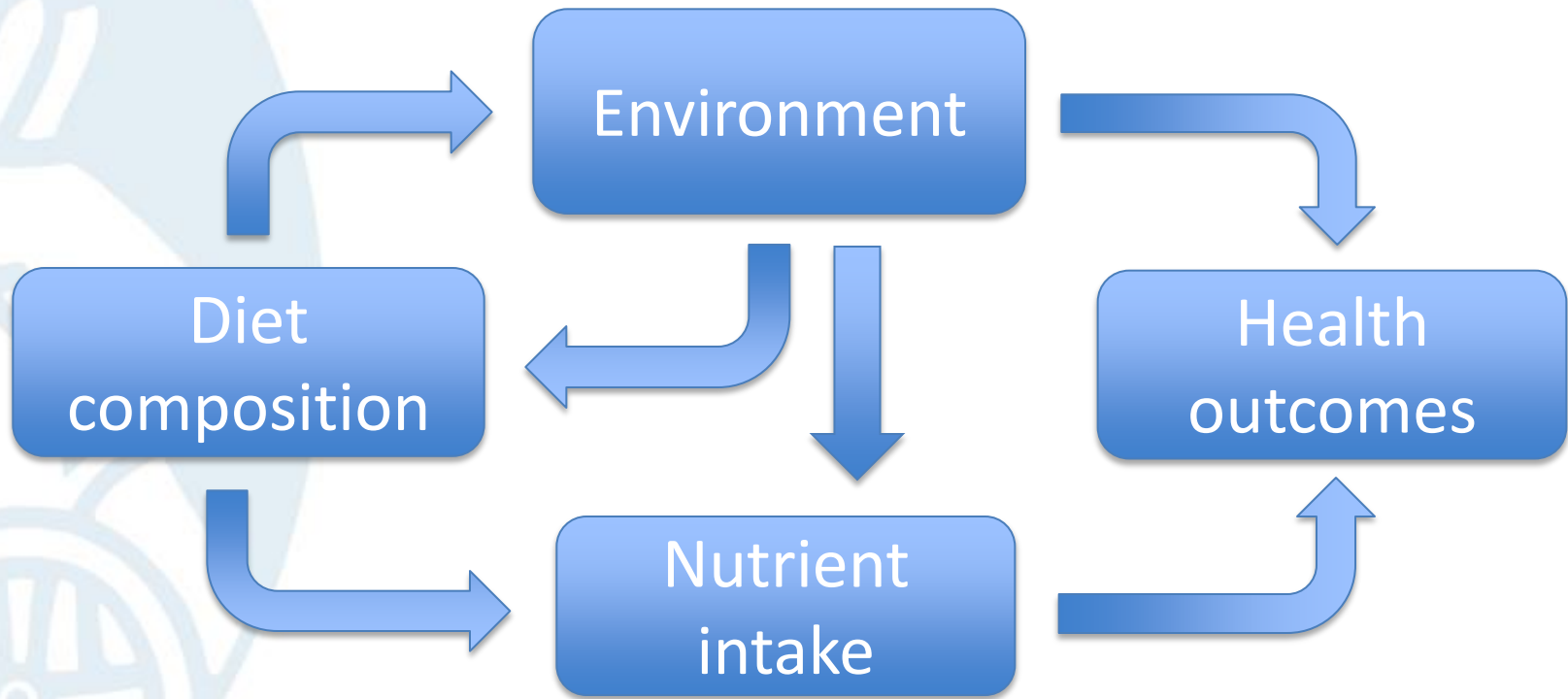
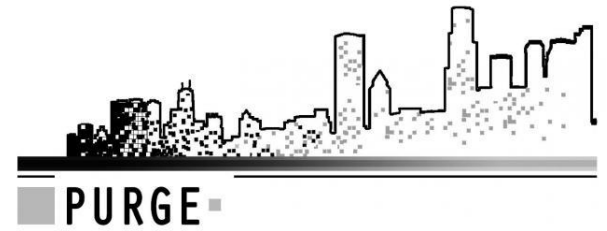
# PURGE: study aims



- PURGE project (**P**ublic health impacts in **UR**ban environments of **G**reenhouse gas **E**missions reduction strategies) – funded by EU FP7
- Exploring health impacts of potential policies to reduce greenhouse gas emissions in Europe, China and India
- This part of the work focused on the environmental impacts of diets and how these could be reduced through dietary change – also health co-benefits

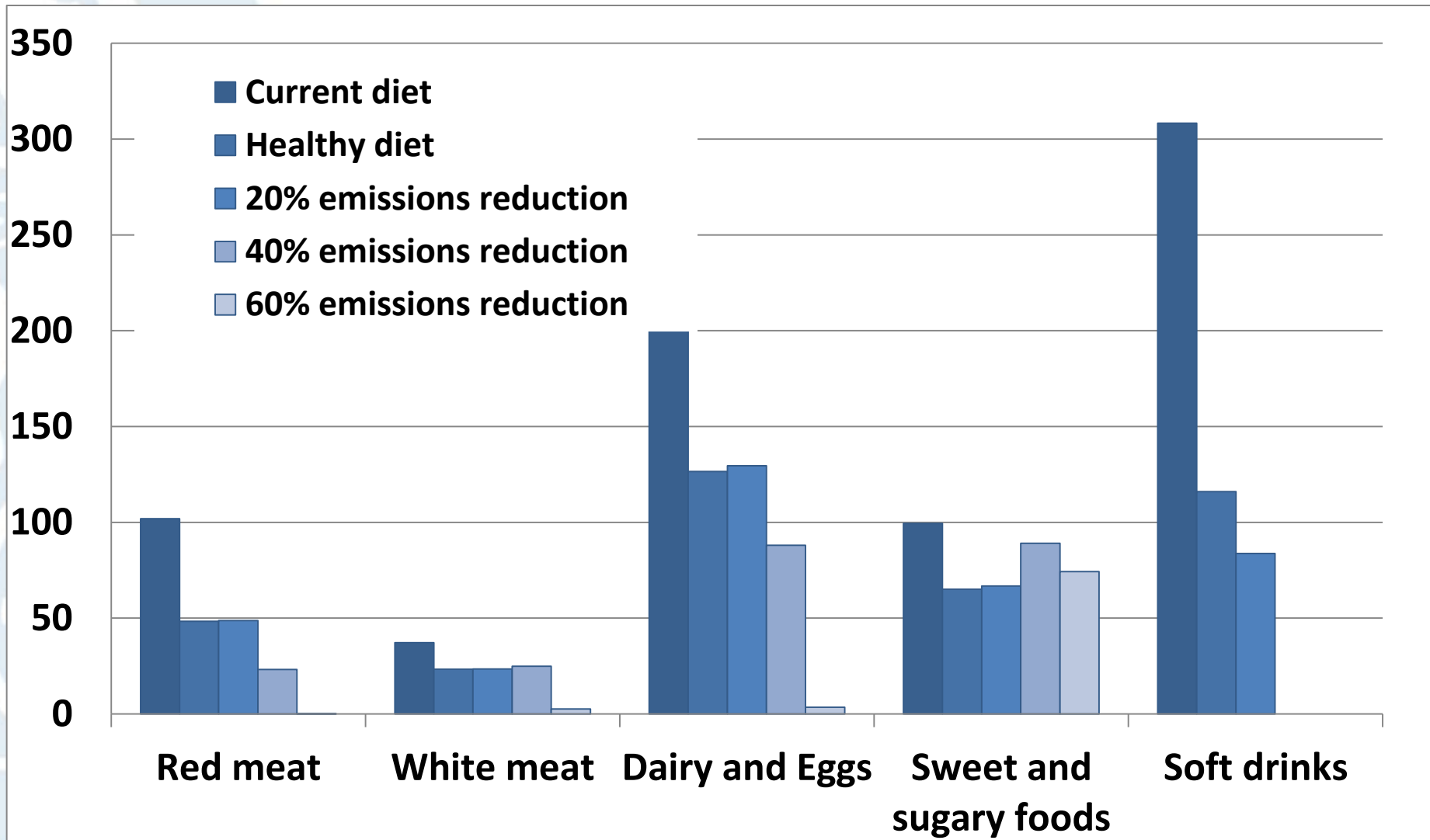


# Environment, nutrition and health





# Optimised diets for men – fatty & sugary foods (g/day)



# Optimised diets for men – staple foods (g/day)

