Realigning UK Food Production and Trade for Transition to Healthy and Sustainable Diets

Work Package-1

Modelling the Transition to Healthy and Sustainable Diets

Challenge of Dietary Change in the UK

- Current UK diets are unhealthy – well recognised by civil society, research and policy communities.
- Large divergence of UK diets from WHO norms/UK dietary guidelines:
  - Less that 1% of UK adults achieve all the recommendations set out in the Eatwell Guide.
  - 96% of UK adults do not consume sufficient fibre.
  - 82% of the population consume excessive saturated fats.
  - Only 17% of the population consume the recommended five-a-day portions of fruits and vegetables.
  - 80% of UK adults consume too much sugar.

[IGD Framework for Population Diet Change, 2025]

Diet Optimisation

- Efforts to generate optimised diets have a long history in nutrition studies.
- 1940s – Use of linear programming approaches to generate optimal diets.
- Challenges:
- Diets optimised for nutrient intakes may not reflect consumer preferences.
- Optimised diets may not be affordable, available or accessible.
- Existing unhealthy dietary patterns may be deeply embedded socially and culturally – often reinforced by food industry marketing.

The Challenge of Dietary Transition

- How can consumers be persuaded to move from current diets to healthier diets - what will the transition process look like?
- Nutrient intakes are derived from a large number of food products chosen by consumers
  - How should diets be adjusted - consumers should consume more or less of which food products?
  - How should consumers' "food basket" change?
  - Can this adjustment process respect consumer preferences (taste, convenience, affordability)?
- Will transition to healthier diets also be better for the environment? Trade-offs between health and sustainability?

WP-1: Main Components

- Estimating changes in consumption of key food products/product groups for transition to healthy diets.
- Comparison of the environmental footprint of current and post-transition (healthier) diets.

Approach to Dietary Transition

- Developed by the USDA in the 1970s – not a new approach!
- Key assumption: Consumers would like to conform to UK dietary guidelines, whilst making minimal changes to existing diets (which reflect prevalent consumer preferences).
- Quadratic programming: Derive "optimised" diets that minimise changes from existing diets while meeting nutritional constraints.
- **Features:**
- **Optimised diets do not involve drastic changes from current diets.**
- **Price impacts on products are not taken into account.**
- **However, affordability constraints can be incorporated.**

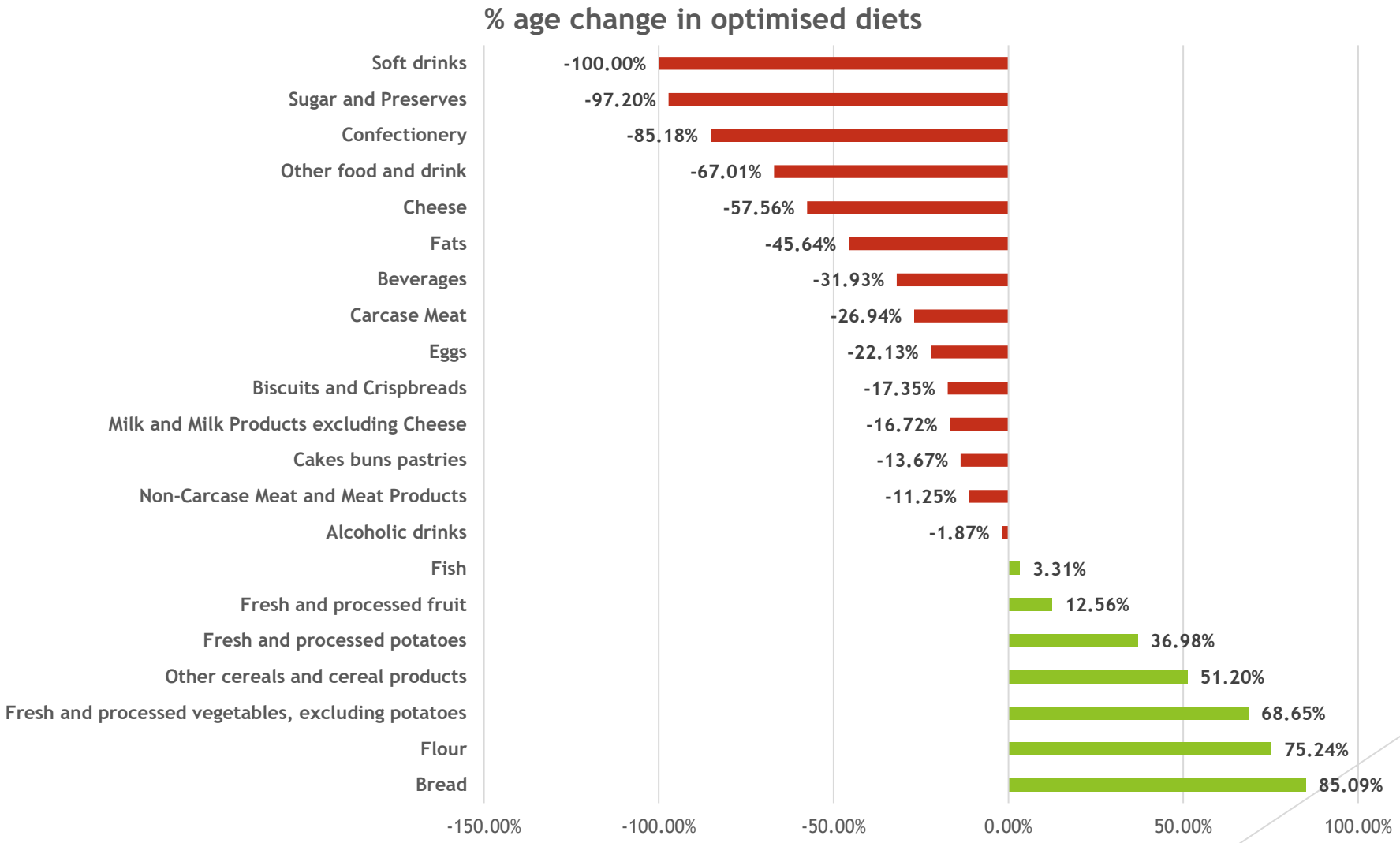
Estimating changes in consumption for transition to HSD.

- Datasets
  - Living Cost and Food Survey – DEFRA family food – food purchases and expenditure at household level
- Programming approach: Quadratic programming
  - Minimise the deviation from existing diets subject to constraints derived from UK recommended dietary guidelines (COMA):
    - Proportion of energy derived total fats: <30%
    - Proportion of energy derived from saturated fats: < 10%
    - Proportion of energy derived from proteins: <15%
    - Proportion of energy derived from (non-milk extrinsic) sugars: <5%
    - Consumption of fruit and vegetables: 400 gms/day
    - Consumption of salt (sodium): < 6 gms per day
    - Consumption of fibre: 30 gms/day (Southgate method)
    - Consumption of alcohol and unhealthy food categories (e.g., fizzy drinks) not to increase
- Estimated percentage change in the consumption of food products/groups at the level of disaggregation available in Family Food

Additional Constraints -AFBI

- In the optimised diet certain product proportions would need to be maintained:
- For livestock products: beef, sheep/lamb, pork, poultry - proportions relevant for carcase derived products.
- For products derived from liquid milk.
- Trade may allow some of the product proportionality constraints to be relaxed.
- Constraint added: For livestock derived products and for liquid milk, share of products within the group should not deviate by more than + or - 5% of the share in the current pattern of consumption.

Results


% age change in optimised diets
Soft drinks
Sugar and Preserves
Confectionery
Other food and drink
Cheese
Fats
Beverages
Carcase Meat
Eggs
Biscuits and Crispbreads
Milk and Milk Products excluding Cheese
Cakes buns pastries
Non-Carcase Meat and Meat Products
Alcoholic drinks
Fish
Fresh and processed fruit
Fresh and processed potatoes
Other cereals and cereal products
Fresh and processed vegetables, excluding potatoes
Flour
Bread
-100.00%
-97.20%
-85.18%
-67.01%
-57.56%
-45.64%
-31.93%
-26.94%
-22.13%
-17.35%
-16.72%
-13.67%
-11.25%
-1.87%
3.31%
12.56%
36.98%
51.20%
68.65%
75.24%
85.09%
-150.00%
-100.00%
-50.00%
0.00%
50.00%
100.00%

Main Results

- Reduction in consumption of **milk and milk products (11.6%)** – offsetting changes – reduction in **cream(60%) different types of milk (15-30%)** offset by increase in the consumption of **skimmed milk (18%)**.
- Reduction in **cheese consumption of 52.5%**; reduction in different types of cheese ranges from **14-60%**.
- Reduction in consumption of **carcase meat (23%), beef (21%), mutton(41%), pork(15%)**. Reduction in **poultry, offal and takeaway meat (11.6%).**
- **22% reduction** in consumption of **eggs** and a **1% increase** in the consumption of **fish** – increase in consumption of white fish offset by decrease in takeaway fish.
- Near elimination of **soft drinks, sugar and preserves**. Reduction in **confectionery (85%), cakes, buns, pastries (13%), biscuits and crispbreads (15%).**
- Substantial increase in consumption of **vegetables (53%)**, overall increase in **fresh and processed fruits is only 3.3%** - large increases in some fruits offset by decreases in fruits with high sugar content.
- Large increase in the consumption of **bread(89%), flour(76%), cereal products (54%)**
- Reduction in consumption of **beverages (39%)**

Environmental footprints of current and post-transition diets

- Environmental parameters:
  - Greenhouse Gas Emissions (GHGs)
  - Water use
  - Land use
  - Eutrophication potential
- Use existing environmental impact databases at food product level - match NDNS food products and categories to these data bases.
- Develop an environmental score for different food products.
- Compare environmental impact scores for current and post-transition healthier diets.
- Examination of potential trade-offs between healthier and sustainable diets.
- **Results: 8-12% reduction in GHG.4-6% reduction in water and land use. No significant effects on eutrophication potential.**

Key Messages

- Transition to healthier diets can be accomplished while minimising changes to current diets.
- Diets optimised in this way are not more expensive than existing diets (cost increase from 2-5%)
- However, the transition to healthier diets will **still** involve large changes (reduction) in the consumption of certain “unhealthy” products.
- These products should be the principal focus for regulatory and policy intervention.
- From a consumption perspective there are no trade-offs between healthier and sustainable diets.