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# **Estimating Food Consumption Changes for Transition to Healthy Diets in the UK**

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## **TUKFS-SPF Project**

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

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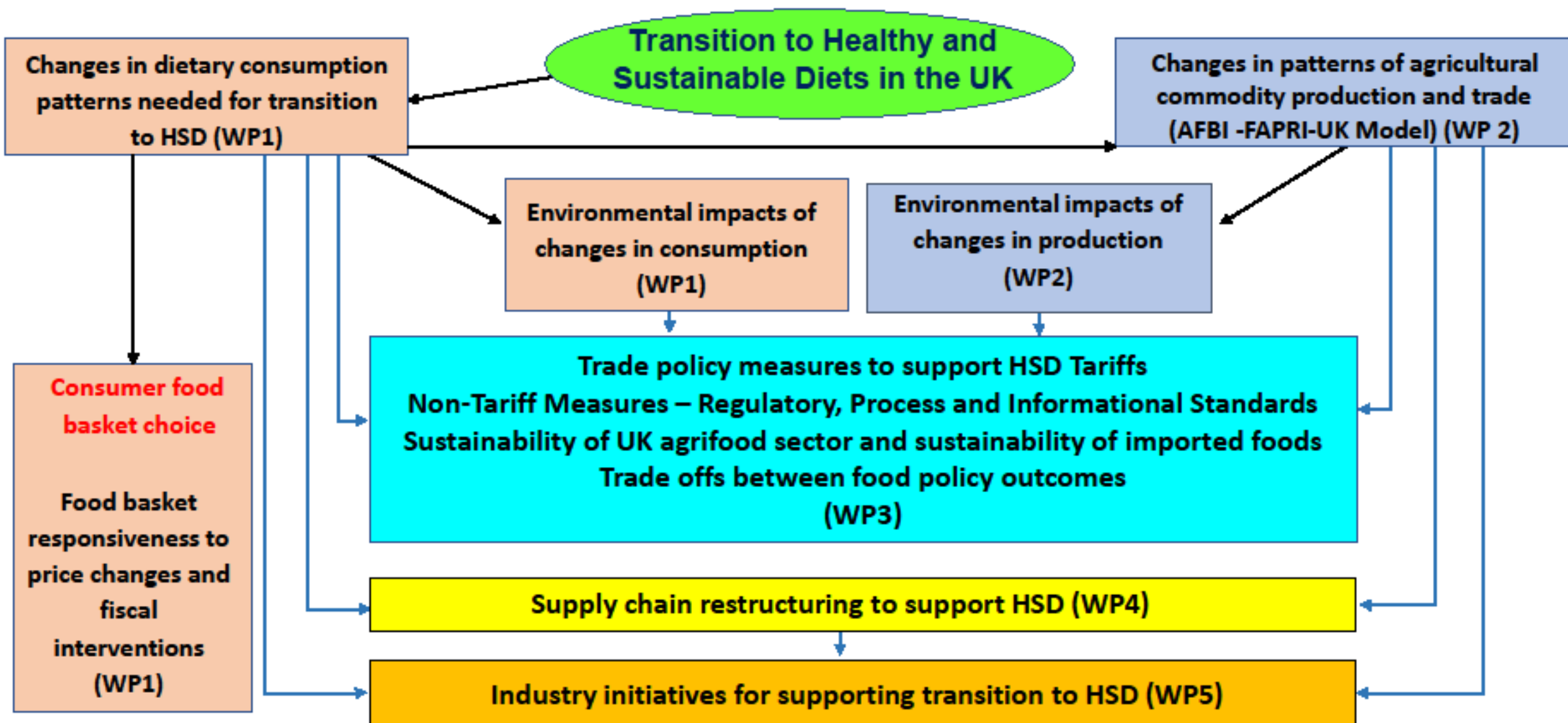
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*Cranfield University*

*University of Kent*



# REALIGNING UK FOOD PRODUCTION AND TRADE FOR 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 than 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.**

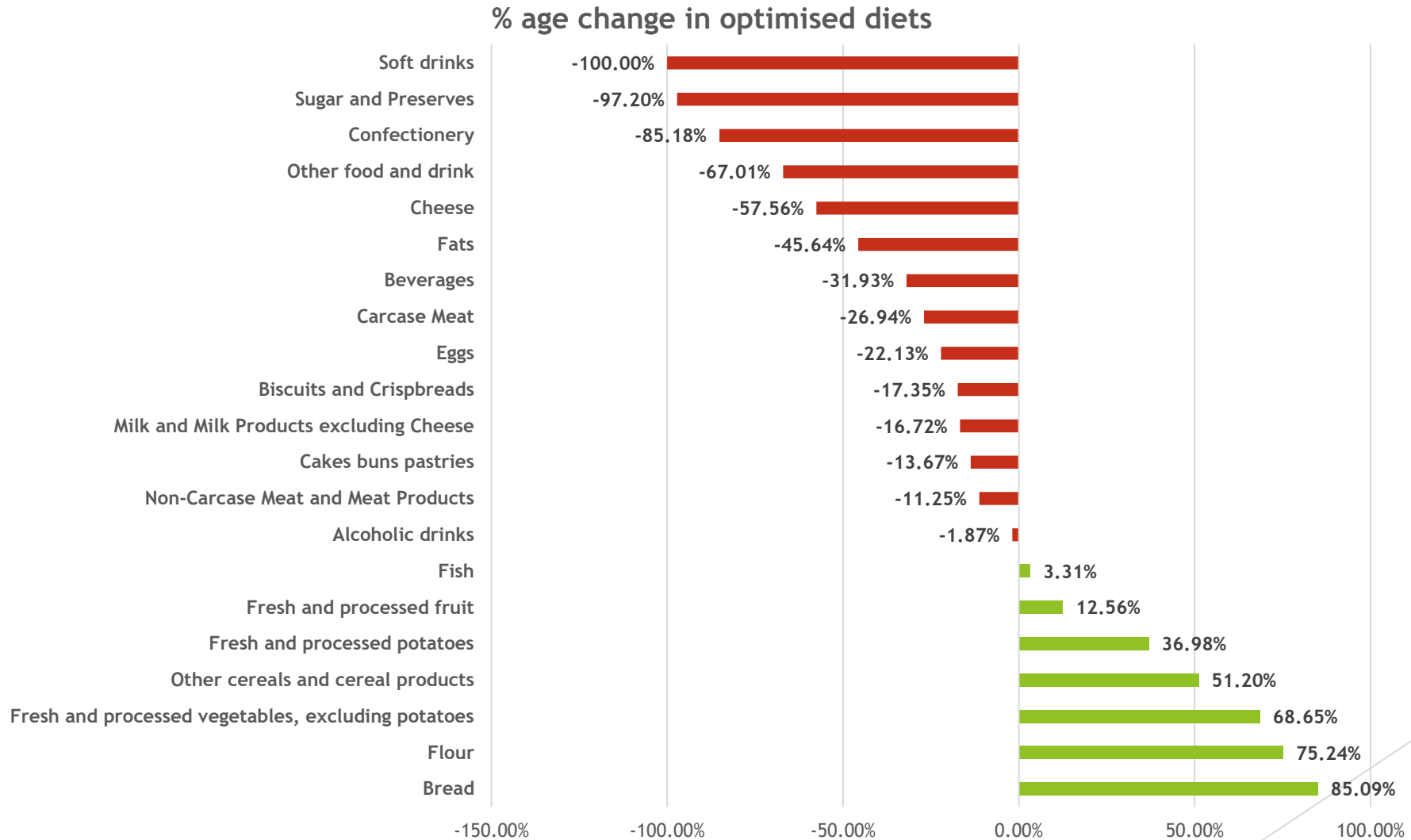
# Estimating changes in consumption for transition to HSD.

- ▶ **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 carcass 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



# 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.