



MRC
Epidemiology
Unit



UNIVERSITY OF
CAMBRIDGE

Generating novel solutions to improve food systems for human and planetary health

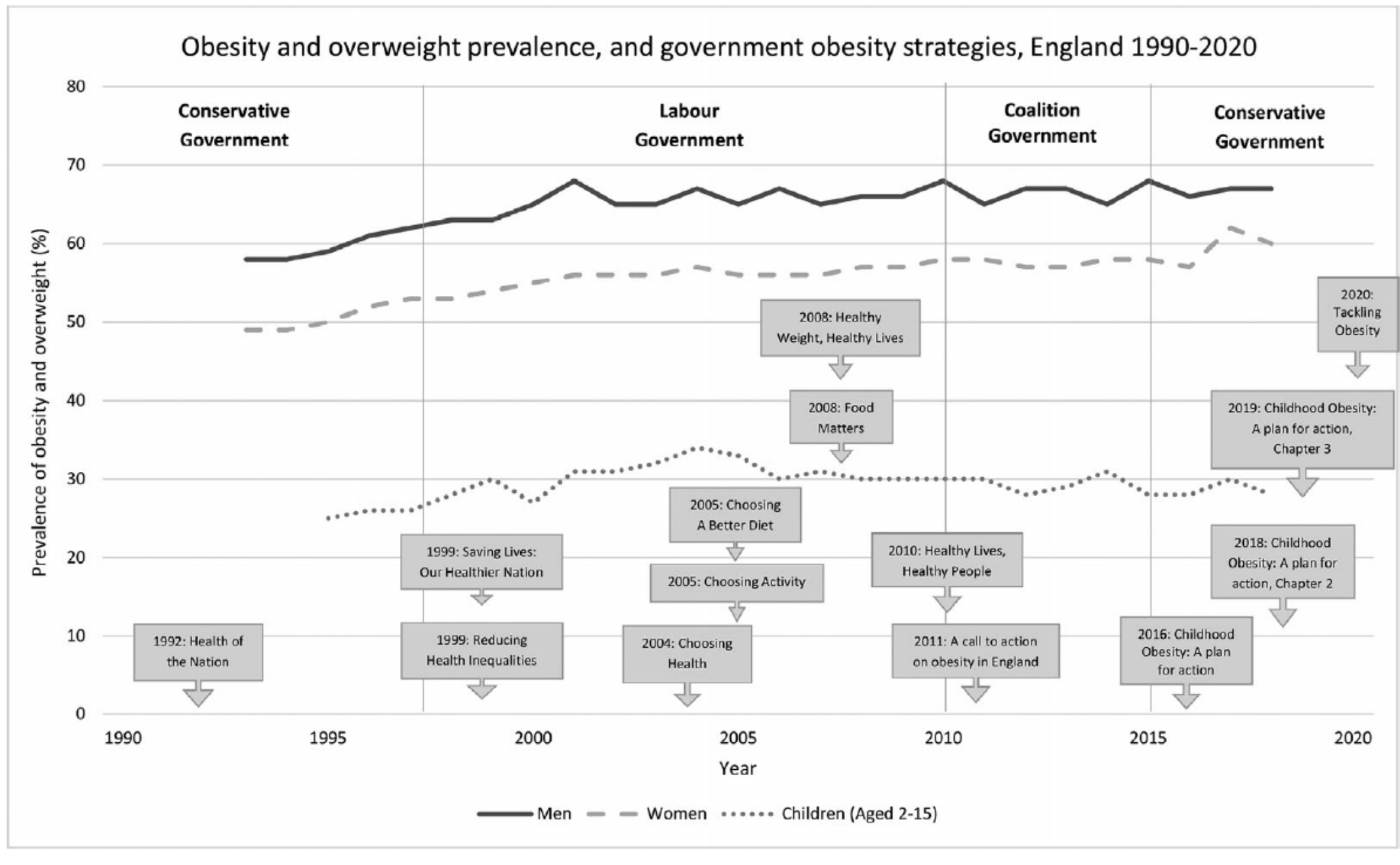
Martin White

Professor of Population Health Research

Cambridge Global Food Security Annual Seminar

6th July 2023

Obesity and overweight prevalence, and government obesity strategies, England 1990-2020





The need for a complex systems model of evidence for public health

Harry Rutter, Natalie Savona, Ketevan Glonti, Jo Bibby, Steven Cummins, Diane T Finegood, Felix Greaves, Laura Harper, Penelope Hawe, Laurence Moore, Mark Petticrew, Eva Rehfuess, Alan Shiell, James Thomas, Martin White

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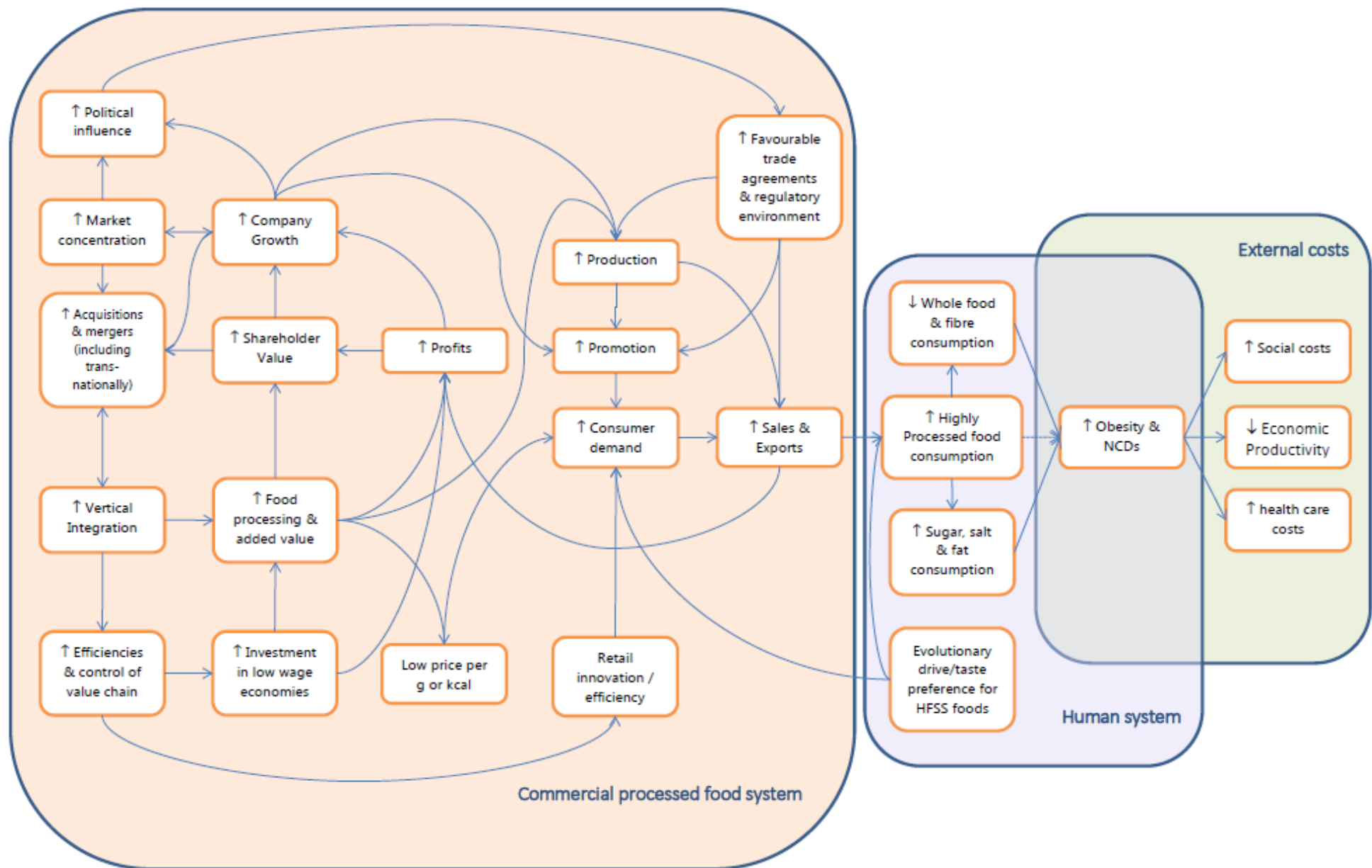
(J Bibby PhD, L Harper BSc);

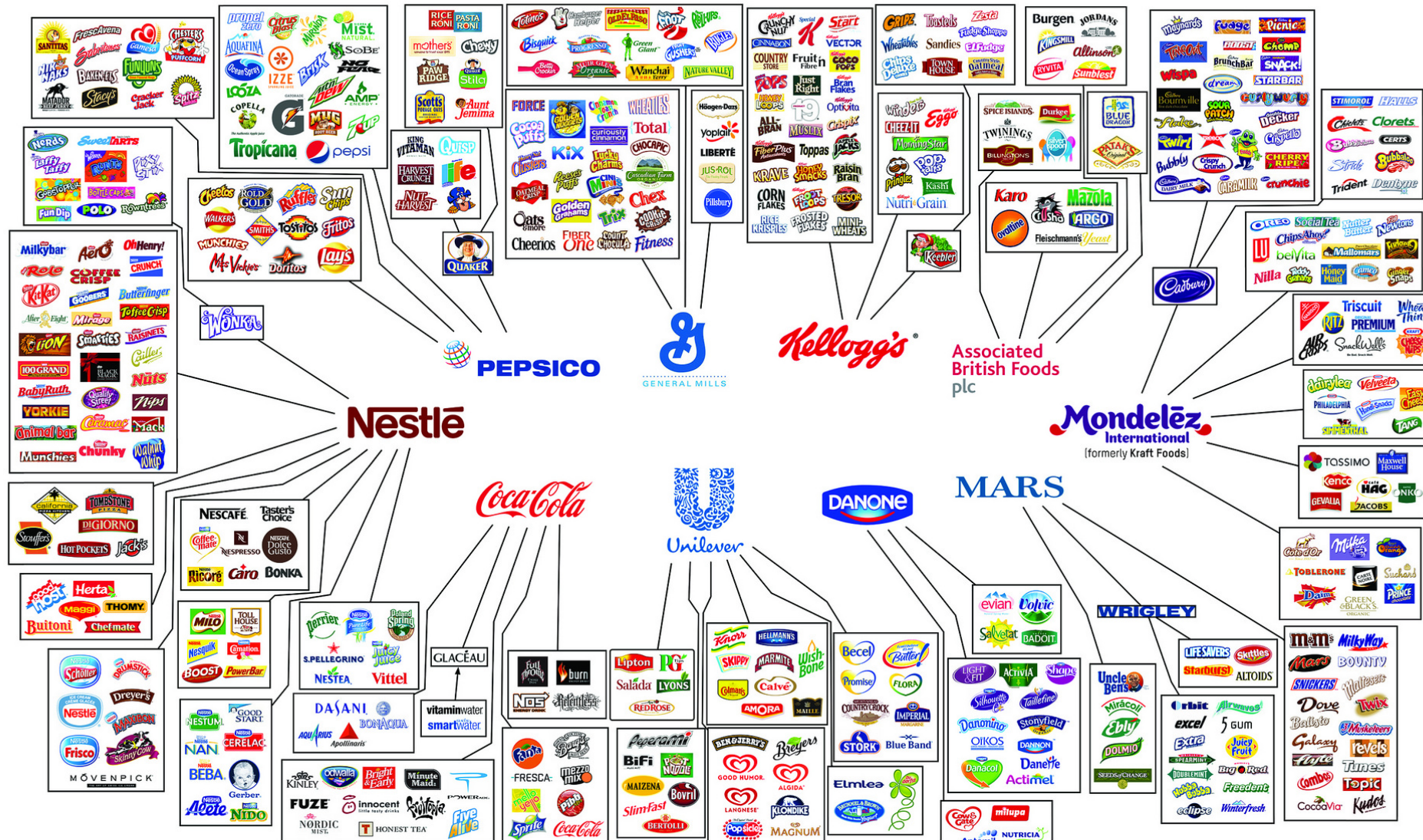
Despite major investment in both research and policy, many pressing contemporary public health challenges remain. To date, the evidence underpinning responses to these challenges has largely been generated by tools and methods that were developed to answer questions about the effectiveness of clinical interventions, and as such are grounded in linear models of cause and effect. Identification, implementation, and evaluation of effective responses to major public health challenges require a wider set of approaches^{1,2} and a focus on complex systems.^{3,4}

which require high levels of individual agency, have low reach and impact, and tend to widen health inequalities.^{9–11} Shifts within multiple elements across the many systems that influence obesity are required, some of which might only have small effects on individuals but can drive large changes when aggregated at population level.¹²

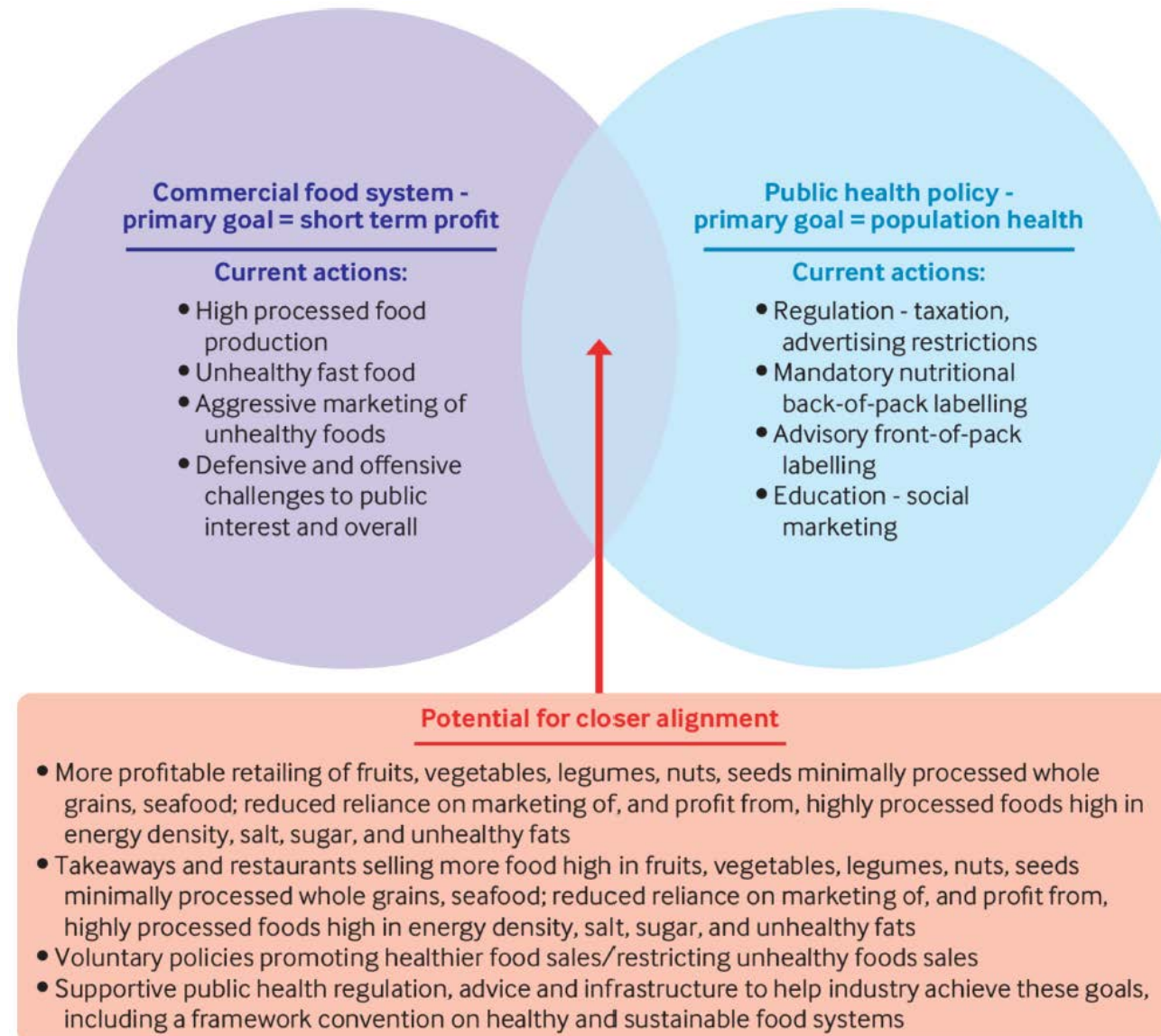
Although randomised controlled trials of individual-level interventions are relatively straightforward to do, it is often impossible to randomise a population-level intervention, such as the introduction of a national tax on sugar-sweetened beverages, or the multiple factors

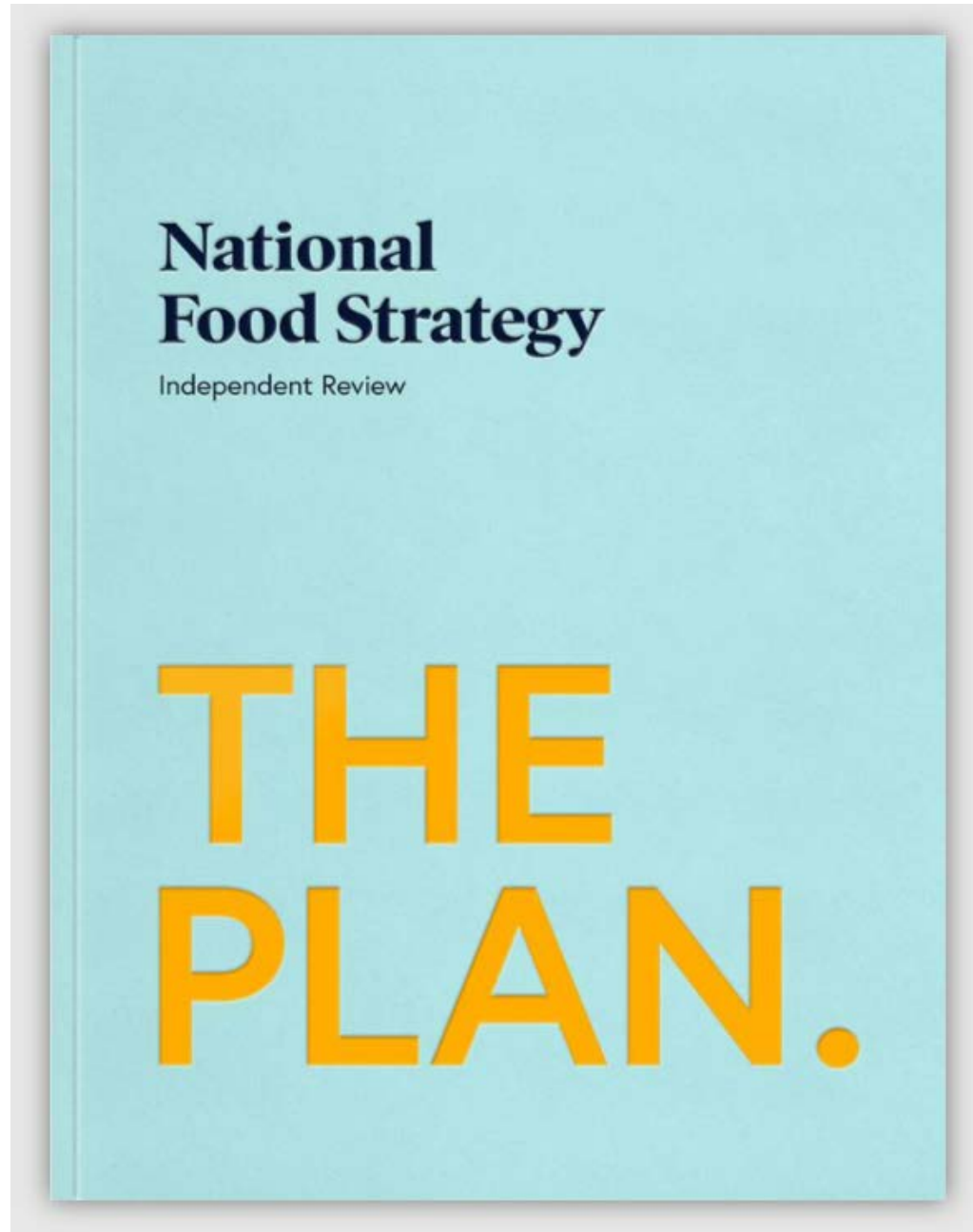
The commercial food system, food processing and NCDs





Goals, actions and alignment of the commercial food system and public health





Published July 2021.
Independent Review,
commissioned by DEFRA in
2019 – with commitment to
bring forward a White Paper
on food system reform within 6
months of publication.

<https://www.nationalfoodstrategy.org/>

Government eventually released a
national food strategy in June 2022

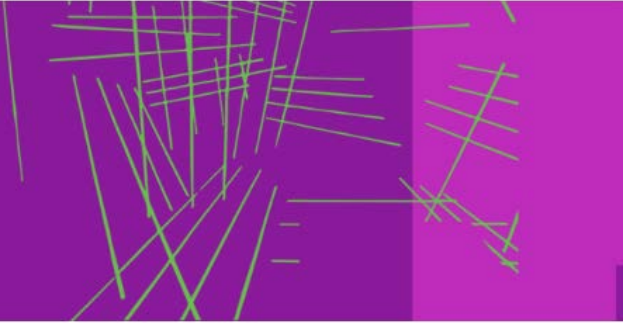
<https://www.gov.uk/government/publications/government-food-strategy>



UK Research and Innovation

TRANSFORMING UK FOOD SYSTEMS

Strategic Priorities Fund



Funding opportunity

[Biotechnology and Biological Sciences Research Council \(BBSRC\)](#), [Economic and Social Research Council \(ESRC\)](#), [Medical Research Council \(MRC\)](#), [Natural Environment Research Council \(NERC\)](#), [Innovate UK](#)

Department for Environment, Food and Rural Affairs (Defra), Department of Health and Social Care (DHSC), Public Health England (PHE), Food Standards Agency (FSA)



- ABOUT THE PROGRAMME
 - PEOPLE AND GOVERNANCE
 - OUR WORK
- ABOUT FOOD SYSTEMS
 - WHY SHOULD WE CARE ABOUT FOOD SYSTEMS?
- RESEARCH PROJECTS, TRAINING AND REPORTS
- NEWS

Welcome to the Transforming UK Food Systems Programme

We aim to fundamentally transform the UK food system by placing healthy people and a healthy natural environment at the centre. To support this aim, we address critical questions, bring together different stakeholders across the food system and deliver evidence to enable action.

→ [Find out more about our work](#)



Food system trials to encourage healthy, sustainable diets

Funders:

[Economic and Social Research Council \(ESRC\)](#)

Co-funders:

Department for Environment, Food and Rural Affairs (Defra), Evaluation Task Force, Cabinet Office and HM Treasury, Food Standards Agency (FSA), Department of Health and Social Care (DHSC), Department for Levelling Up, Housing and Communities (DLUHC), Department for Education (DfE)

Funding opportunity



SALIENT

Food system trials for healthier people and planet

nesta



GOV.UK

The Evaluation Accelerator Fund (EAF) supports evaluation across government to transform our understanding of the impact of activity in priority policy areas.



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TRANSFORMING
UK FOOD
SYSTEMS
Strategic Priorities Fund



CEDAR



Mandala

Transforming urban food systems



Our people



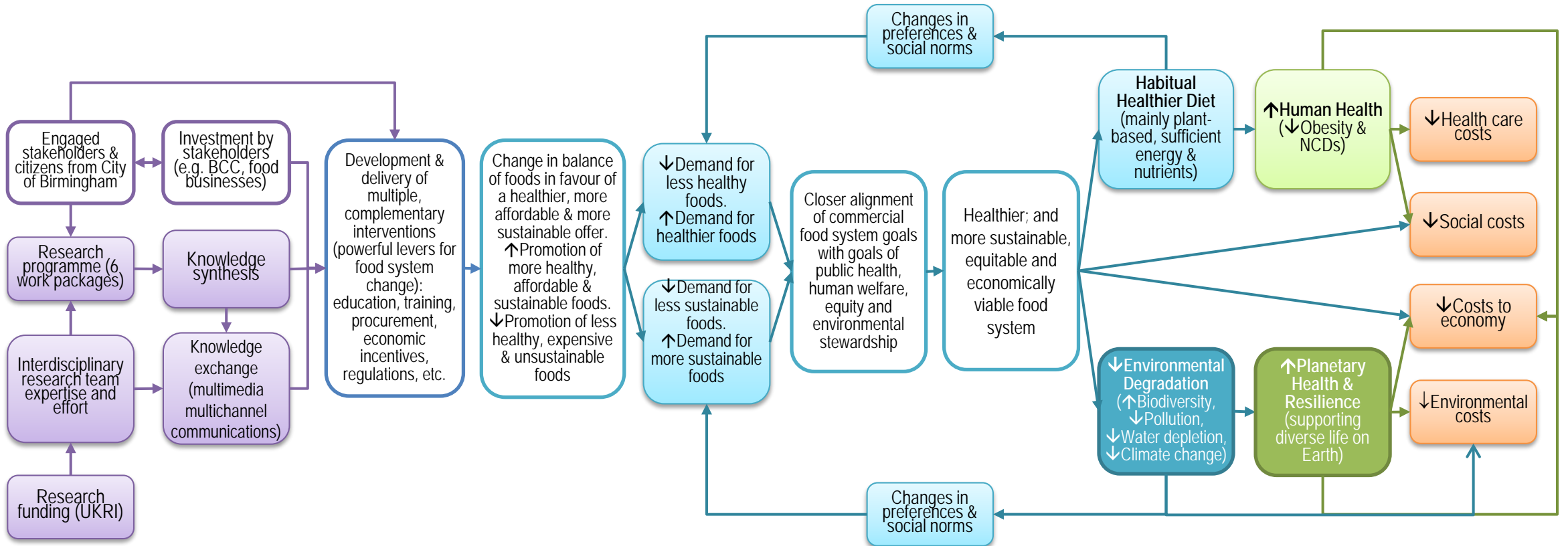
- Mandala is an interdisciplinary consortium of international experts in population health, food and nutrition, environmental sustainability, systems science, health economics and commerce
- Investigators come from the Universities of Birmingham, Cambridge, Exeter and Warwick, and the London School of Hygiene and Tropical Medicine, University College London and King's College London
- We are partnering with:
 - Birmingham City Council
 - NGOs, including the Food Foundation, Soil Association, Growing Communities, Sustainable Food Places
- We are also working with:
 - Commercial partners including industry associations, wholesalers, supermarkets and other retailers, and social businesses

Our Vision



- To catalyse urban food system transformation, focusing on the City of Birmingham as a scalable case study, partnering with citizens and food system stakeholders to create a reproducible, collaborative change process
- To forge a novel, research ecosystem to ensure the co-production of evidence-informed solutions to current food system challenges
- To generate food system interventions that will lead to meaningful health, environmental, economic and societal impacts
- To influence action in cities across the UK and internationally using the body of knowledge generated

Theory of change

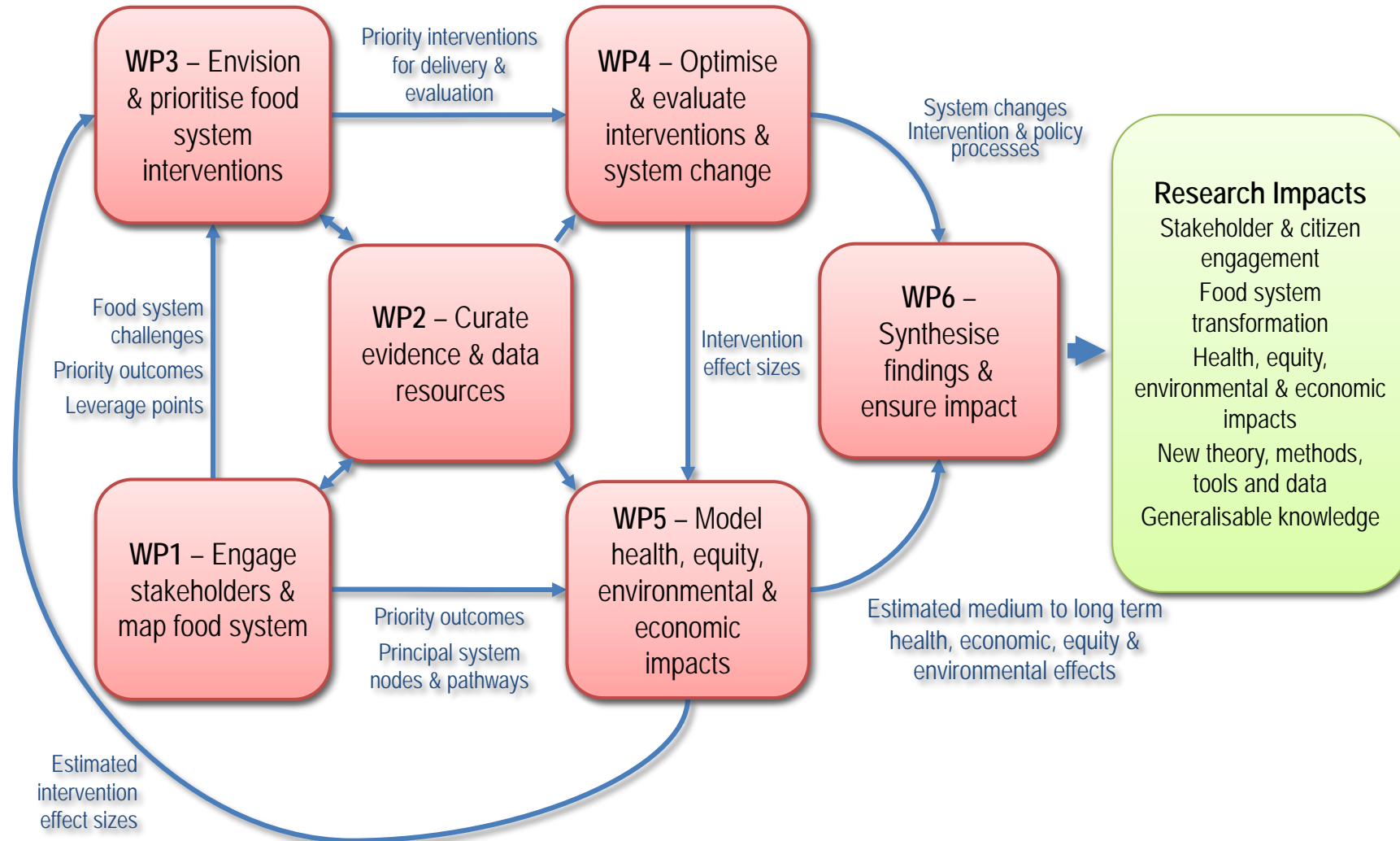


Our principles

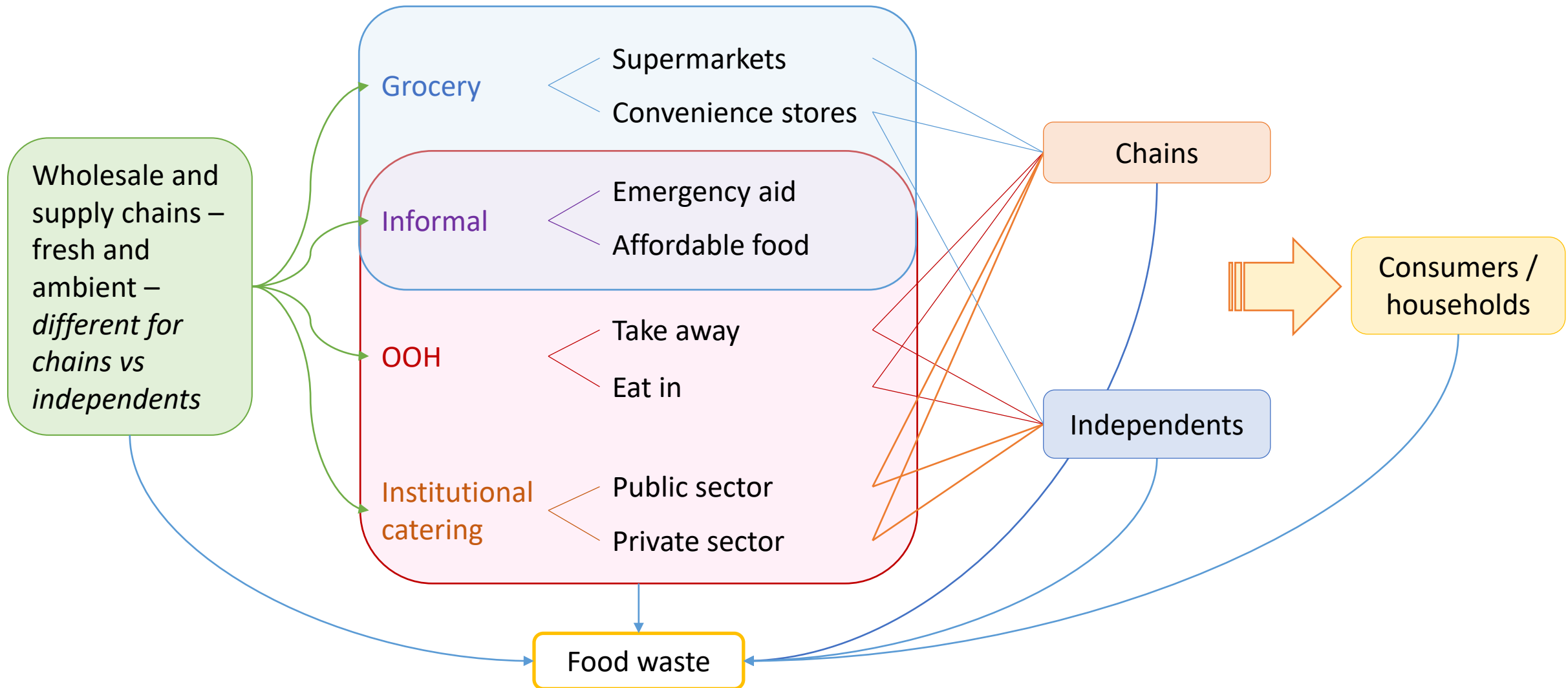


- Co-production with stakeholders, including all sectors and the public
- Closer alignment of commercial and population health and sustainability goals
- Minimise external costs of the food system (environmental, social and health)
- Prioritise population level, low agency interventions
- Design and deliver interventions within complex adaptive systems framework
- Anticipate and mitigate unwanted industry reactions to interventions

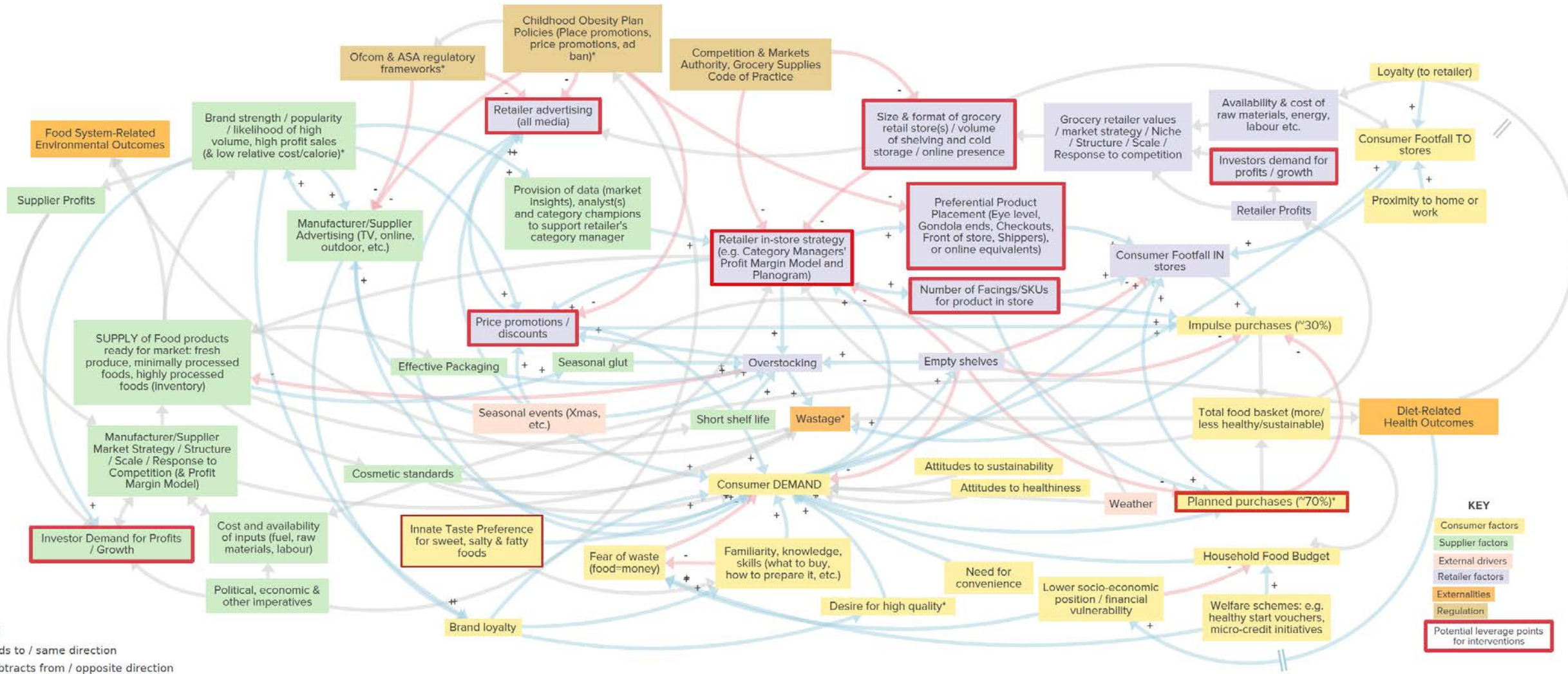
Inputs, outputs and flow



Sectors: relationships and characteristics



Grocery sector Causal Loop Diagram



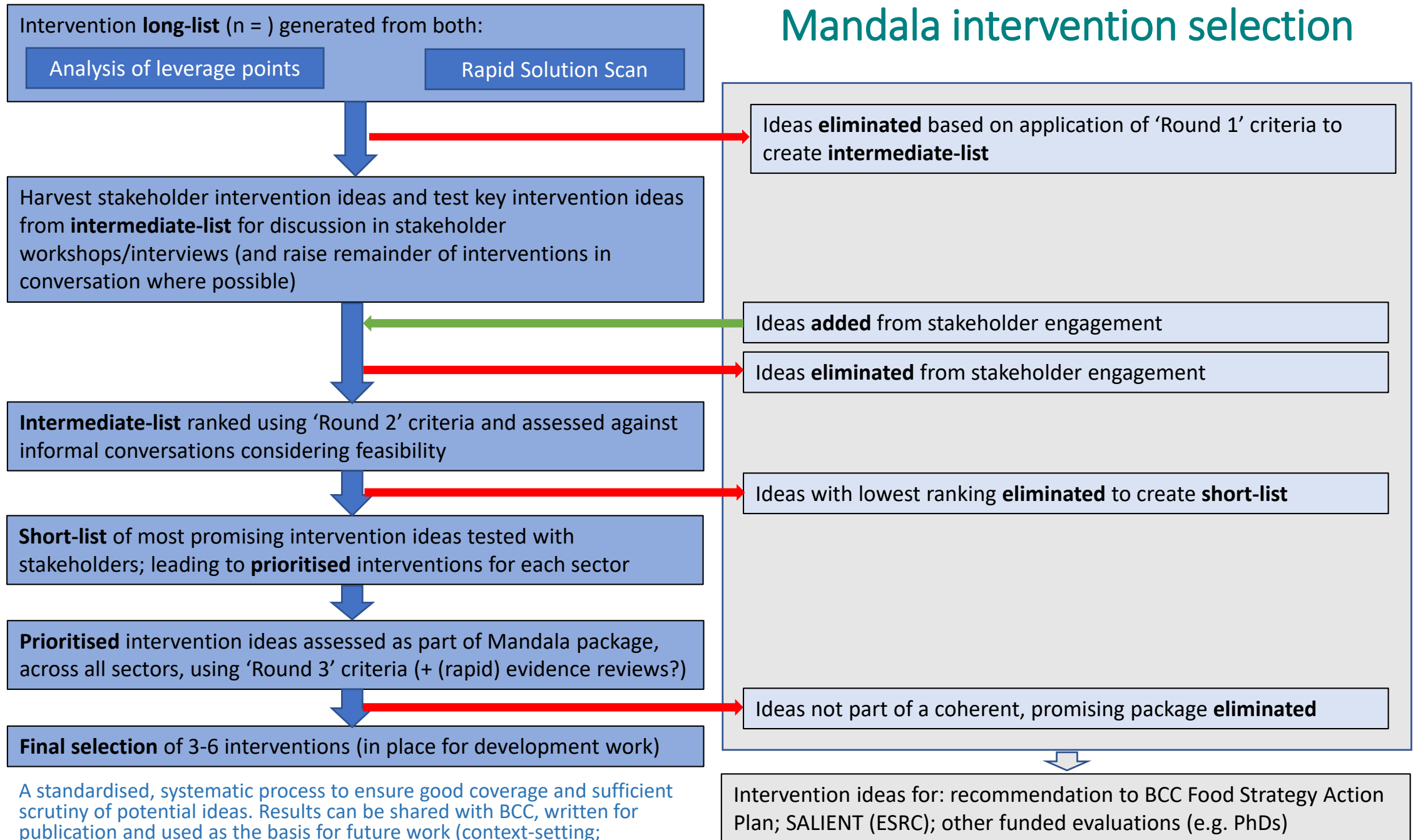
Feedback loops identify leverage points



Grocery CLD

Problem	Potential solution
1. Category management leads to overall imbalance of unhealthy/healthy in stores and means customers have work out how to turn ingredients into meals (requires complex knowledge and skills, time and effort)	<ul style="list-style-type: none">• Different ways to present foods in ways more meaningful to consumers?• Start with an aisle dedicated to meal collections (like a menu box scheme) – focused on healthy and sustainable meals• Accompany with QR codes for recipes or an app (Whisk?)
2. Manufacturer and retailer marketing out of/in store prompts impulse purchases (product placement, advertising, offers etc.)	<ul style="list-style-type: none">• Work out how to promote planned purchases to drive home food preparation and drive down impulse purchases - ?digital solutions for online/in-store shopping/links to loyalty cards?
3. Convenience stores struggle to sell fresh produce – due to lack of space, chillers, supplies	<ul style="list-style-type: none">• Work out solutions to improve efficiency and enable supply logistics (e.g. digital supply system)

Mandala intervention selection



A standardised, systematic process to ensure good coverage and sufficient scrutiny of potential ideas. Results can be shared with BCC, written for publication and used as the basis for future work (context-setting; generating a vision for a future food system)

CRITERIA & CATEGORY		DETAILS	CONSIDERATIONS
FOOD SYSTEM IMPACTS	Level (Reach) (R1; R2)	Population level interventions tend to minimise demands on individuals	<ul style="list-style-type: none"> Impact = Reach x Effect Size Helpful to distinguish where intervention has the potential for effects – e.g. environment vs population Levels where there is large variation in outcomes may be most promising for intervention
	System Leverage Points (R1; R2)	Identified Leverage Point/Barrier to Healthy Sustainable Food System Addressed	<ul style="list-style-type: none"> Powerful vs Weak Leverage Point?
	Transformative Potential (R1; R2)	Potential for ‘disruptive innovation’	<ul style="list-style-type: none"> Will it really lead to a step-change in current practice? Does it represent a tipping point?
	Outcomes (R3)	Priority Food System Outcomes Addressed (Healthier; More Environmentally Sustainable; Fairer; Economically Viable)	<ul style="list-style-type: none"> Primary Outcomes/ Secondary Outcomes Trade-Offs between outcomes are likely Possible unintended consequences
	Activities (R3)	Food System Activities Addressed	<ul style="list-style-type: none"> Primary Activities/Potential Secondary Activities (Wider system impacts from ripple effects) Potential for changing demand and supply Potential for private/public sector change Possible unintended consequences
FEASIBILITY OF IMPLEMENTATION	Cost (Financial) (R2)	Costliness to implement (as a pilot for evaluation, or for mainstream delivery)	<ul style="list-style-type: none"> Who will pay (and why) Possible funding sources from public or private sector, for piloting or mainstream delivery
	Technical (R2)	Technical barriers to delivery	Can these be readily solved with R&D?
	Deliverability (R2)	Actors required for delivery	<ul style="list-style-type: none"> Who?

CRITERIA & CATEGORY		DETAILS	CONSIDERATIONS
EVIDENCE	Theory (R1: CLDs & literature; R3: ToC)	Suitability based on theory	<ul style="list-style-type: none"> Coherence based on existing theory (theory from literature, or theory as indicated by the CLD)
	Need (R1; R3 comparative assessment)	Evidence of need for intervention	<ul style="list-style-type: none"> Epidemiological, environmental, or other evidence
	Effectiveness (R2; R3)	Existing evidence of <i>effectiveness</i> , or <i>cost-effectiveness</i>	<ul style="list-style-type: none"> Unlikely to be direct evidence of the intervention if an entirely novel design. In this case, could potentially identify evidence for components of the intervention, or evidence of interventions in other sectors. Alternatively, theory may provide a strong rationale for a novel intervention. Or modelling evidence suggestive of likely efficiency or effectiveness Evidence may come from international peer-reviewed literature or grey literature (e.g. policy evaluations, including local evaluations in B'ham or by commercial or other organisations – NB Risk of bias)
(POLICY) COHERENCE	Existing B'ham Interventions (R1)	Alignment with existing B'ham interventions and other activities	<ul style="list-style-type: none"> Anything similar already operating in B'ham now? Anything like this been tried in B'ham before?
	National Level Policy (R1)	Alignment with outcomes and interventions at national level	<ul style="list-style-type: none"> National food policy priorities National food policy activities (e.g. DEFRA trials)
	Commercial or organisational Strategy (R2)	Alignment with commercial or other stakeholder strategy (if applicable).	<ul style="list-style-type: none"> Is the proposed intervention acceptable to the stakeholder? Does it align with their strategy? What changes would be needed to ensure alignment?
	Local Policy/BCC Food System Strategy (R3)	Alignment with BCC outcomes and interventions (identified in the Strategy)	<ul style="list-style-type: none"> BCC outcomes that the intervention targets Overlap with interventions proposed in Strategy/in stakeholder consultation Our interventions do not need to align with BCC strategy, although in some cases it may be important
	Internal Mandala (R3)	Coherence with other Mandala Interventions	<ul style="list-style-type: none"> Synergies – do interventions 'work' together? Tensions – are two or more interventions antagonistic?

CRITERIA & CATEGORY		DETAILS	CONSIDERATIONS
MANDALA RELATED	Evaluability (R3)	Is the intervention readily evaluable? 5 Questions.	<ul style="list-style-type: none"> • Data availability, desk research • Refer to: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-0009.2011.00626.x
	Synergy and Evaluation (R3)	Can interventions be evaluated together (e.g. in factorial design)? Can we evaluate the combined effect of interventions in different parts of the system?	<ul style="list-style-type: none"> • Relationship between chosen interventions and evaluations will need careful consideration. • Opportunities for combined evaluation should be considered. • Scope for system level evaluation of all interventions needs to be considered

OOH intervention: Affordable, healthy takeaway



What is the intervention and how will it work practically?

- Vegetarian, healthy, street-front takeaway in Balsall Heath, using mostly surplus food.
- Pay-what-you-feel/pay-it-forward model: full price, discounted, minimum contribution (£1/free).
- Fridge for cook-chill meals to heat at home.
- Up to 10 seats, parklet at the front.

How will it change the system?

- By increasing exposure to healthy outlets (via increased number and density of outlets), it could increase preference for healthy OOH options, especially for individuals on a lower income / living in lower-income neighbourhoods
- By altering the ratio of unhealthy food price: healthy food price (due to reduced costs and reduced need for profit), it could increase consumption and consumer buying power.
- Could reduce meat consumption, reduce food waste and increase training and job opportunities.

Who will deliver it and on what timescale?

- ChangeKitchen, social enterprise caterers.
- Launching in early June, pilot funded by BCC and others.

Considerations and reflections

- Small scale; ChangeKitchen have ambitions to open more takeaways across the city.
- Located in a lower-income, highly diverse neighbourhood, on a street with a few other 'unhealthy' takeaways, on a busy cycle route into city centre.
- Fairly risky: the economics of this venture are untested (coffee offer is considered important stream of income).
- Scope for evaluating different models: pay-it-forward / pay-what-you-feel, food delivery .

OOH intervention: Affordable, healthy takeaway



Round 1 criteria	Rating
Level	Small potential reach; health & env; may expand
System leverage points	Potentially powerful, but weak given low reach
Transformative potential	May not be scalable on current model
Theory (CLD)	Fits well
Evidence of need	?
Alignment with B'ham interventions	Funded by BCC
National level policy	Lots of previous discussion of something like this






Round 2 criteria	Rating
Reach	Small potential reach; health & env; may expand
System leverage points	Potentially powerful, but weak given low reach
Transformative potential	May not be scalable on current model
Financial cost	BCC supporting; costs are key evaluation Q
Technical barriers	Needs demonstration
Deliverability	ChangeKitchen
Evidence of effectiveness	Theory proposes effective; needs broader review
Commerical/ organisational strategy	ChangeKitchen proposed



We will prioritise interventions with the best chance of large, equitable, and long-term effects on healthy, sustainable food purchasing.

We will test at least 10 interventions (single or in combination) across 3 sectors representing the majority of purchasing decisions: retail, catering and community support.

We will focus on:

-  **Availability.** Increase/reduce availability of (un)healthy and (un)sustainable foods, e.g. via reformulation of existing unhealthy/unsustainable products.
+ /
-  **Size.** Reducing portion and package size of UPF.
+ /
-  **Promotions.** Restricting advertising, marketing
+ /
-  **Price.** Encouraging purchasing of HSF foods through favourable pricing/ price promotions
+ /
-  **Provision of information.** Environment and nutrition labelling

Reflections and challenges

- Eminently possible to generate novel solutions to food system challenges using systems thinking tools
- Highly dependent on stakeholder engagement
- Which can be challenging with some sectors
- Leading to sub-optimal solutions
- Existing evidence needs complementing with creative approaches to solution generation
- Tools needed to prioritise candidate solutions
- Ultimately, bravery needed from policymakers

Next steps

- Securing meaningful intervention delivery from stakeholders
- The challenges of real-world evaluation and co-design
- Synthesising evidence within and between interventions
- Generating policy impact
- Turning our methods into usable tools
- Scaling up approach at national level



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Mandala

Transforming urban food systems



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