Transforming UK Food Systems (TUKFS) Programme

Interim Impact Evaluation Report

09 June 2025

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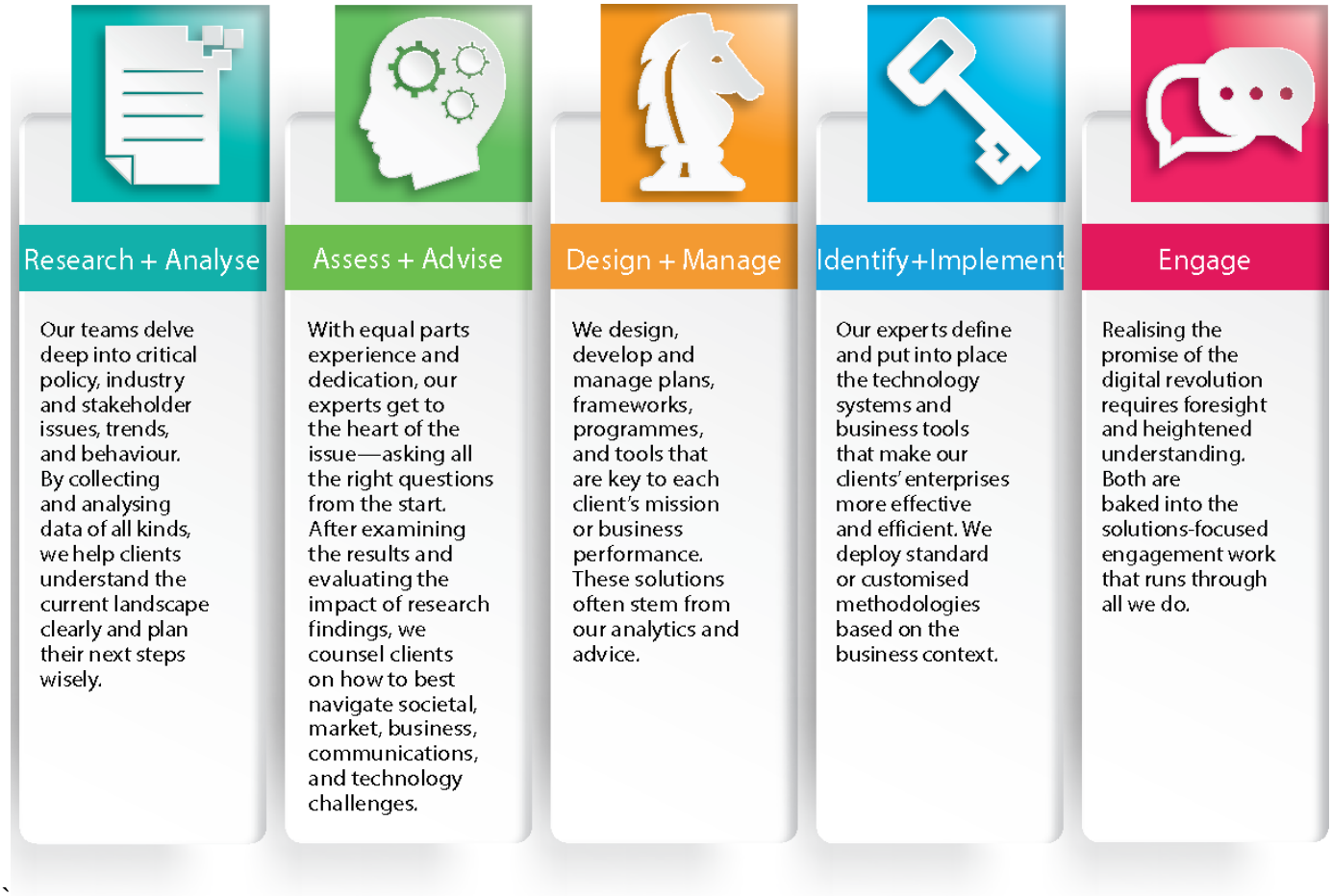

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ICF technopolis group

Transforming UK Food Systems (TUKFS) Programme

Interim Impact Evaluation Report

A report submitted by ICF Consulting Services Limited
in association with

Technopolis

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Abbreviations and acronyms

Abbreviation	Acronym
CDT	Centre for Doctoral Training
CSO	civil society organisation
Defra	Department for Environment, Food and Rural Affairs
ECR	early career researchers
FB	food business
FSA	Food Standards Agency
MIDRI	multi and interdisciplinary research and innovation
PI	principal investigator
RAG	red, amber, green
SEFS	Social Enterprise as a Catalyst for Sustainable and Healthy Local Food Systems
SPF	Strategic Priorities Fund
ToC	theory of change
TUKFS	Transforming UK Food Systems
UKRI	UK Research and Innovation

Executive summary

The Transforming UK Food Systems (TUKFS) programme

The Transforming UK Food Systems (TUKFS) programme is the largest coordinated research effort in the UK, providing unprecedent funding for food systems research. It is a £47.5 million, multiyear (2021 to 2026) interdisciplinary research programme funded by UK Research and Innovation (UKRI) through its Strategic Priorities Fund (SPF). The programme aims to transform the UK food system by placing healthy people and a healthy natural environment at its heart.

The five objectives of the TUKFS programme are to: (1) transform UK diets to be healthier and more sustainable; (2) change the behaviour of actors across the food system from production to consumption; (3) model interdependencies across the UK food system to join up healthy and accessible consumption with sustainable food production; (4) co-produce research between academia and stakeholders; and (5) develop a pipeline of skilled people who apply critical, interdisciplinary systems thinking to the food system. The first two are highly ambitious and long term (strategic), and the remaining three are more action focused, shorter term and operational.

To achieve these objectives, the programme has: funded 16 multiyear, multistakeholder research projects through three calls for proposals; invested in a Centre for Doctoral Training (CDT) which has enrolled 56 students across 3 cohorts; and commissioned supporting research and activities using a budget managed by the Programme Director.

The programme started in 2021 with Call 1 projects. Call 2 projects were awarded in 2022 and Call 3 began in 2023. The first CDT cohort started in September 2021, the second in September 2022 and the third in September 2023. Each cohort programme runs for four years.

The evaluation approach

This is the interim impact evaluation report for the TUKFS programme. The evaluation is being delivered over a four year period from 2022 to 2026 by ICF and Technopolis working in collaboration with Science Metrix and independent experts.

The evaluation uses a theory based methodology to assess progress towards the programme's expected outputs and outcomes. The findings presented in this report build on the baseline assessment, using data collected by the evaluation team between February 2024 and August 2024. The research involved surveys of project leads, project partners and CDT students; a series of semi-structured stakeholder interviews; and a document review. The evaluation team also completed a document review, analysis of posts on the X social media platform, network analysis, and a detailed analysis of ResearchFish data submitted by the funded projects. None of the funded activities had finished when the report was first submitted (August 2024).

Main findings

This report provides evidence of progress in the activities and outputs specified in the TUKFS programme theory of change (ToC). It also indicates early progress towards TUKFS' expected outcomes. The programme is on track to delivering the four main impact pathways in the ToC. There is evidence of progress on activities and outputs in line with the ToC for TUKFS, and emerging evidence of progress towards TUKFS expected outcomes.

The programme is providing funding that will contribute to food systems research at scale in the UK. It is delivering and disseminating co-produced and multi and interdisciplinary research and innovation (MIDRI), building skills and capacities, and working across geographical scales in the UK. It is also assessing the food system from farm to fork, including its interdependencies. By partnering with stakeholders beyond academia, the programme is introducing new perspectives on the food system and how to work collaboratively. MIDRI further supports stakeholders to addressing the multi layered challenges of the food system by working with multiple disciplines and tools.

The skills and knowledge that have been generated by the TUKFS programme are, to some extent, being adopted by the TUKFS network of 311 stakeholders. There is some evidence that this is leading to changes in the stakeholders' practices and behaviours. As of August 2024, there was limited evidence of how these outputs were influencing stakeholders beyond the TUKFS programme.

The programme's long term results will only be seen a decade or more into the future, but there are early signs that TUKFS is laying the groundwork for transformational change in the UK food system. The long term expectation is that TUKFS will contribute to broader food systems transformations by disseminating knowledge and skills, and influencing the behaviour and practices of food system stakeholders in the UK. TUKFS plans to synthesise and disseminate the programme's evidence during the last phase (2025 and 2026) will be crucial in determining whether the programme can accomplish its full potential impact.

TUKFS is generating **research and co-produced knowledge** at the forefront of food systems research, as well as **building a pipeline of skilled researchers**. The programme has funded 16 research projects that have provided support to 130 early career researchers (ECRs). The CDT is the first in the UK to offer interdisciplinary postgraduate training focused on food systems. Fifty-six PhD students are being trained by the CDT and 14 PhDs funded by the research projects. All the projects are delivering cross cutting food systems approaches that are collaborative and MIDRI. New collaborations and partnerships have been formed, and many intend to continue after the programme ends, with a network of 311 diverse stakeholders as project partners. This network has a longer term potential impact, that will be explored in the final report. As of March 2024, the funded projects had collectively published 92 academic outputs and 17 non academic outputs, including blogs, toolkits, and games. Further, as of March 2024, they had disseminated knowledge through 715 recorded engagements, 191 collaborations, and 85 instances of policy influence.

The programme has, via the projects, engaged over **100 food business (FBs)** in various roles. These roles range from formal partners developing technology to advisory roles providing data inputs for modelling. Partner FBs are trialling new business models, products, processes, or policies to address food related challenges, such as environmentally sustainable menus for schools or universities. Additionally, at least nine projects are partnering with FBs to develop or reformulate healthier and more sustainable food products. The programme has exposed FBs to new ways of collaborating with researchers and policymakers, encouraging future collaborations to address challenges.

Twelve projects are **working with policymakers at local, regional, and national levels**, including 39 public sector organisations and 83 civil society organisations (CSOs). The programme has informed seven food system policies, strategies, and action plans at local and regional levels, with at least one instance leading to a change in national policy regarding provision of free school meals.

Projects are **actively involving citizens in local food systems transformations**. 93% of principal investigators (PIs) and project coordinators reported engaging with citizens through primary data collection, and 79% reported using participatory research methods. Community involvement has been facilitated by strong CSO partnerships, participatory research

methods, and creative outputs. Citizen led activities have had a tangible impact on the local food system, with community researchers benefiting from increased skills and confidence. Projects have disseminated knowledge through community researchers, community networks, and creative outputs, with 17 creative products being reported.

The TUKFS programme design has been effective at supporting delivery of the programme's objectives. TUKFS is on track to accomplish the last three objectives (3 to 5). The first two objectives (1 and 2) are highly ambitious and aspirational; as such, it is not an expectation that the TUKFS programme will accomplish them within its lifetime. Table ES1.1 summarises programme status against each of the TUKFS programme's objectives using the red, amber, green (RAG) rating system.

Table ES1.1 Summary of the progress made towards the programme's objectives

Programme's objective	RAG rating	Commentary
1. Transform UK diets to be healthier and more sustainable, as well as desirable and accessible, for all groups in society (life stage, gender, ethnicity, income, region and neighbourhood); and determine how UK food production, manufacturing, retailing and imports can address current barriers to delivering these diets in a sustainable way.	**Amber**	■ Any evidence of impact on this objective will emerge after the TUKFS programme is complete. ■ There is evidence of contribution to dietary transformation in the research areas that the projects and CDT students are focusing on.
2. Change the behaviour of actors across the food system, from production to consumption, including using big data approaches to understand food choices (e.g. loyalty card data) and drivers; and transform food environments so that the healthy and sustainable choice is desirable and accessible across all groups and communities.	**Amber**	■ TUKFS is generating food systems evidence, producing outputs and expanding knowledge on food systems. ■ TUKFS projects aim to influence the behaviour of the diverse partners they are working with towards data driven decisions to transform food environments into healthy and sustainable ones.
3. Model interdependencies across the UK food system to join up healthy and accessible consumption with sustainable food production; and link datasets to improve decision making, identify win-wins, manage trade offs and avoid unintended consequences, with the long term aim of developing a digital twin of the food system.	**Green**	■ The research projects' focus areas cover almost all areas of the food system in the UK and join up production and consumption. ■ 10 projects are focusing on modelling interdependencies and generating datasets. Some of this knowledge is expected to be published during the life of TUKFS.
4. Co-produce research between academia and stakeholders (UK government, business and civil society) to ensure that new knowledge drives multi pronged and simultaneous action across the food system.	**Green**	■ Strong examples of co-production happening with FBs, government, CSOs and communities. ■ All the projects align with government priorities and engage regularly with government

Programme's objective	RAG rating	Commentary
	Green	▪ There is less evidence of uptake, but this is expected. Wider systems change is mainly expected beyond the life of TUKFS.
5. Developing a pipeline of skilled people who apply critical, interdisciplinary systems thinking to the food system to strengthen UK capacity and capability, and drive the change required in academia, industry and government.		▪ TUKFS is supporting a pipeline of 56 PhDs via the CDT and 100 ECRs. There is anecdotal evidence of ECRs receiving additional grants or moving on to other roles. ▪ There is evidence of the uptake of food systems knowledge across TUKFS programme participants, and of the knowledge being disseminated widely beyond programme activities.

1 Introduction

This report has been prepared by ICF with the support of Technopolis. It presents the findings of the interim evaluation of the Transforming UK Food Systems (TUKFS) programme.

1.1 The TUKFS programme

The TUKFS programme is a £47.5 million interdisciplinary research programme running from 2021 to 2026. It is funded by UK Research and Innovation (UKRI) under the Strategic Priorities Fund (SPF), with a contribution from the Department for Environment, Food and Rural Affairs (Defra). The programme aims to improve individuals' diet related health by integrating healthy and accessible consumption with sustainable food production in a novel and interdisciplinary way. It addresses two principal questions:

- 'If we put healthy people and a healthy natural environment at the heart of the food system, what would we eat, how would we encourage people to eat it, and where would that food come from? What would we grow and manufacture in the UK and what would we need to import?'
- 'In delivering this transformed food system, what interventions would be needed across government, business and civil society?'[1]

Transforming the UK food system is an ambitious vision. The programme aims to address specific barriers to the transformation: research and training. This focus aligns with SPF's aims of strengthening the UK's research capacity as a world leader and addressing gaps in UK research funding[2]. It also aligns with UKRI's vision for 'an outstanding research and innovation system in the UK that gives everyone the opportunity to contribute and to benefit, enriching lives locally, nationally and internationally'.[3]

The TUKFS programme vision is that by 2030 the combined effect of interdisciplinary research and training will have 'enabled transformation of the UK food system by placing healthy people at its centre and critically linking this with creating a healthy natural environment, helping the UK government to deliver its targets of a 50% reduction in childhood obesity and a 57% reduction in greenhouse gas emissions.'[4]

The programme has five objectives (Figure 1.1). The first two are highly ambitious and long term (strategic), and the remaining three are more action focused, shorter term and operational.

[1] https://www.ukri.org/wp-content/uploads/2021/02/BBSRC-020221-Funding-Opp-TransformingUKFoodSystemsHealthEnvironment-PurposeAims.pdf
[2] https://beta.ukri.org/wp-content/uploads/2022/07/UKRI-190722-StrategicPrioritiesFundBaselineInterimProcessEvaluation-TechnicalReport.pdf
[3] https://www.ukri.org/who-we-are/our-vision-and-strategy/our-vision/
[4] As outlined in the TUKFS programme original business case.

Figure 1.1 TUFKS programme's objectives

The TUKFS programme aims to achieve these objectives by:

- Funding multi year, multi stakeholder and multi disciplinary research projects to increase supply of the knowledge needed to accelerate UK food system transformation. There were three competitive funding calls with a funded value of: £24.5 million for 4 large consortia projects (Call 1, started in 2021); £13.5 million for 11 projects (Call 2, started in 2022); and £0.7 million for 1 additional project (Call 3, started in 2023). All funded research had to take a food systems approach and be co-produced by researchers and stakeholders to provide evidence for coherent policymaking and action across UK government, businesses and civil society.
- Funding a Centre for Doctoral Training (CDT) (£5 million) which enrolled 56 students across three cohorts.[5] The CDT will increase the supply of people who have an interdisciplinary, systems perspective on tackling issues in the food system, support the flow of that knowledge, and build capabilities and capacity for the organisations in which they work, thereby increasing the scale of application for food systems approaches now and into the future. The first CDT cohort started in September 2021, the second in September 2022 and the third in September 2023. Each cohort programme is four years.
- Use of a Director's budget (£1.8 million) to fund *ad hoc* studies and activities to help ensure coordination and collaboration, across programme activities and

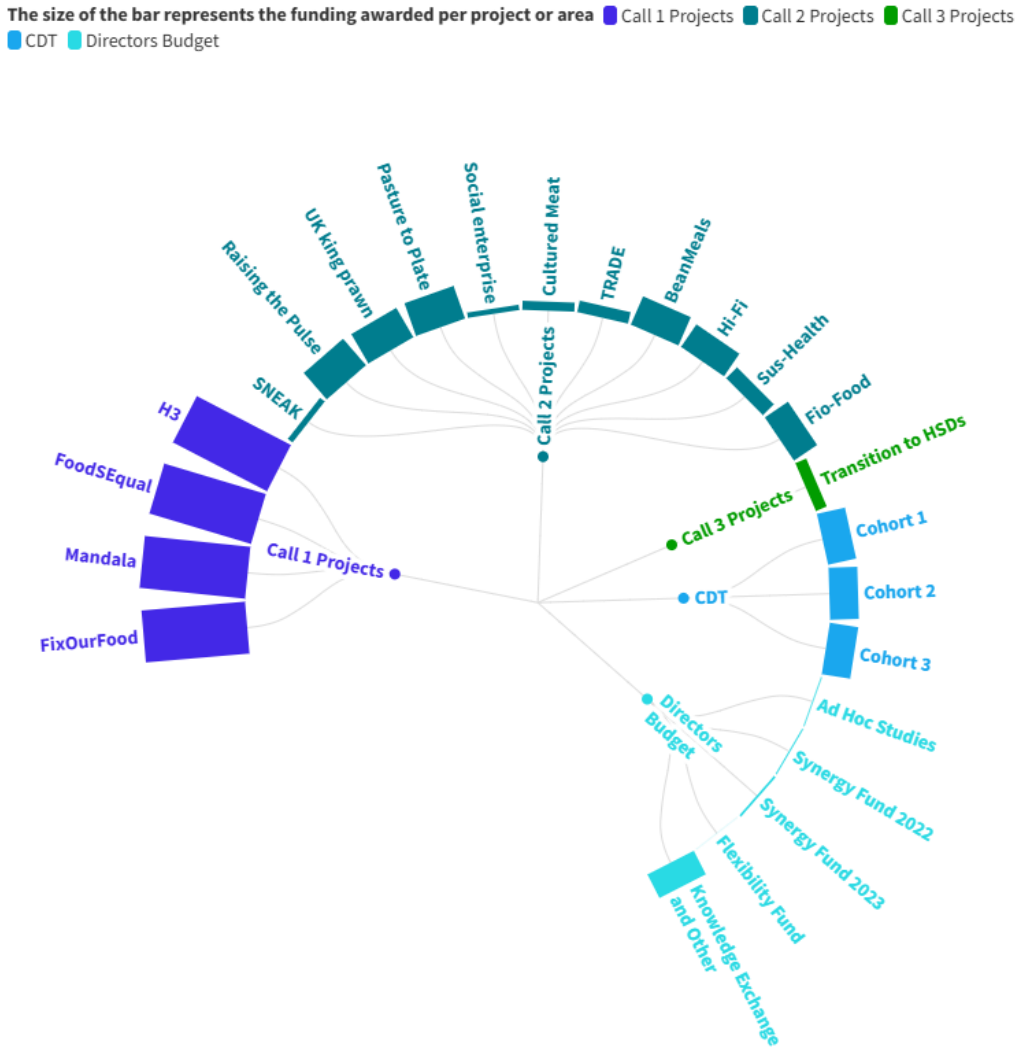
[5] The CDT originally envisioned training up to 60 interdisciplinary doctoral researchers. In the end, the number of students is 56, adjusting for higher than expected costs per student.

related investments in the area, as well as to encourage knowledge exchange and programme advocacy internally and externally.

These activities will help address cross departmental policy priorities, and the objectives of government food strategies and legislation, particularly the National Food Strategy (2021) and the Good Food Nation (Scotland) Act 2022.[6] They will also aim to reduce diet related chronic disease, reduce pressure on health and social care systems, align food production systems to health and sustainability outcomes, reduce greenhouse gas emissions and other environmental impacts, and ensure future food security.

A summary of the activities funded by TUKFS is provided in Figure 1.2 below. Further details about the composition of each activity are provided in the Annex document.

Figure 1.2 Activities funded by the TUKFS programme – radial treemap[7]



[6] The Report – National Food Strategy; Good Food Nation (Scotland) Act 2022 (legislation.gov.uk)

[7] The radial bars represent funding provided to each programme activity. The CDT funding is divided between the cohorts, so that each cohort is shown on the diagram. The CDT bar represents the total amount of CDT funding divided equally across the 3 cohorts. This is an assumption, and funding may have been distributed differently across the cohorts.

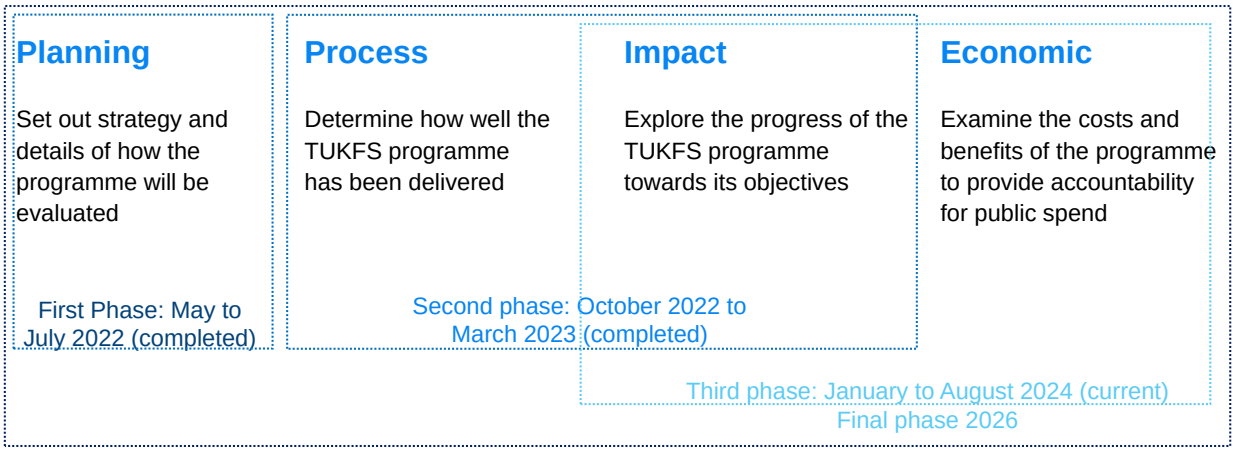
1.2 Evaluation approach

UKRI commissioned ICF and Technopolis to undertake an independent evaluation of the TUKFS programme to assess:

- the effectiveness of taking a food systems approach, and the extent to which it has been adopted by academic researchers and stakeholder organisations;
- the effectiveness of an interdisciplinary, cross stakeholder approach to generating new knowledge relevant to multiple stakeholders;
- how effectively the knowledge generated has informed policy and practice to help improve health and sustainability outcomes;
- the extent to which the programme has wider social and economic impacts; and
- the extent to which the programme has contributed towards improved health and environmental outcomes, alongside an indication of the potential economic value of longer term impacts.

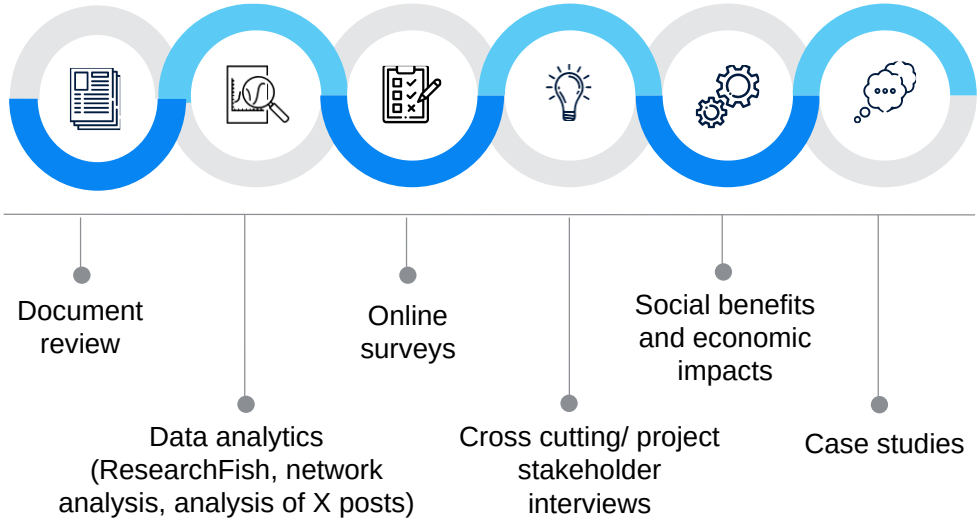
The evaluation addresses seven process evaluation questions and eleven impact evaluation questions, as well as social benefit and economic evaluation questions. The study is being undertaken in four phases from 2022 to 2026 (Figure 1.3). This report is the main output of the third phase – the interim impact evaluation. The economic evaluation will be conducted at the final stage of the evaluation.

Figure 1.3 Evaluation phases and (expected) timeline



This interim evaluation report builds on the previous two study phases and is based on evidence gathered up to August 2024. Figure 1.4 provides a summary of the evaluation approach, covering six months of data collection and analysis.

Figure 1.4 Summary of evaluation approach



1.2.1 Data collection and analysis

The Annex document provides a full description of the methodology which, in summary, involved:

- A theory based 'contribution story' linking programme activities to the main outputs and emerging outcomes, and their potential effect on wider and longer term impacts. The theory of change (ToC) (summarised in Figure 1.5 and expanded in the Annex document) captures TUKFS' expected outputs, outcomes and impacts.
- Use of the following qualitative and quantitative methods:
  - A review of programme data and documentation (ResearchFish data, programme, project and CDT data, and contextual information).
  - A survey of project leads and project partners (which follows a survey conducted for the process and baseline evaluation)[8]. This new survey ran between February and April 2024 and received 79 responses. 56 were from academic (71%) and 23 from non academic partners (9 civil society organisations (CSOs), 5 from food businesses (FBs), 2 from government organisations and 7 from 'other' respondents).[9] Routing within the survey enabled different questions to be presented to principal investigators (PIs), academic partners, FBs, CSOs and policy partners where required.[10]
  - A survey of CDT students, conducted between May and June 2024, which received 27 responses (8, 9 and 10 from cohorts 1, 2 and 3 respectively).

[8] The first survey was conducted between January and March 2023 and received 34 responses.

[9] Just over half of responding PIs/project coordinators (11 of 21) were found to be involved in more than one project, with five PIs/project coordinators classifying themselves as academic partners too. Within this analysis, when discussing the differences between different types of stakeholders (i.e. PIs/project coordinators, academic partners and non-academic partners), the five respondents with a dual role (as a PIs/project coordinator, and academic partner) are included in both groups. This means their responses are included twice in any disaggregation between respondent categories.

[10] Some questions were also routed based on stakeholder responses to previous questions. For example, all 56 academic partners and PIs were initially asked whether they hoped their project would impact business behaviour. 35 of 56 respondents, 63% hoped that the project would impact business behaviour, and these 35 respondents were then asked a question about how the project would impact business behaviour.

  - 70 interviews (between May and August 2024), including at least 1 interview or workshop with each project lead and project coordinator, more than 45 interviews with project partners, five with wider stakeholders (including academic, policy and FB stakeholders), and four with programme management and CDT leadership.
  - Observation of the TUKFS programme annual event, several project webinars and workshops/events.
- Eight case studies (described in the Annex document) that explore the progress made by projects towards the outcomes and impacts defined in the ToC. The case studies will be updated as more evidence becomes available later in the evaluation process. Each case study uses evidence from three to six TUKFS projects, ensuring that all funded projects are represented. Table 1.1 shows the titles of the eight case studies and the impact pathway explored in each.

Table 1.1 Case study (CS) focus by impact pathway explored in that case study

Skills and capacity for food systems research in the UK	Business practices	Government policy	Community/citizen behaviour
CS1: Increased UK capacity and capability in food systems research	CS3: Introduction of new healthier and environmentally friendly products to the UK market	CS5: Transforming public distribution channels to be healthier and more sustainable	CS7: Citizens are empowered to have more agency over their diet
CS2: Co-production methods lead to relevant food systems knowledge	CS4: Changes in business practices help transform food systems	CS6: Food system approaches to implement new policy frameworks/ strategies at different levels (national, regional and local)	CS8: Citizen voices lead transformations in food systems locally

1.2.2 Limitations

The challenges and limitations encountered, and the mitigation strategies adopted to address them, are described below.

This report draws on evidence from different sources that was captured during programme delivery. Not all stakeholders were available for consultation. All funded activities were ongoing during the data collection phase and the CDT had not submitted its 2023 annual progress report. As such, it is based on emerging evidence, and it is too early to identify much in the way of outcomes achieved.

Although the ResearchFish data collected in March 2024 was more comprehensive than the data reviewed as of March 2023 (15 projects submitted a response compared to 3 in 2023), it still had limitations (e.g. one project did not provide data). The study team worked closely with UKRI to improve the comprehensiveness of the data and the number of responses. Further information is provided in the Annex document.

Most of the evidence is based on data collected from programme participants or the management team. To avoid respondent bias, data collection tool design followed best practice in evaluation research. Leading questions were avoided and, for the outcome harvesting, project participants were asked open questions about outcome areas and attribution. The data collected were triangulated with other available data.

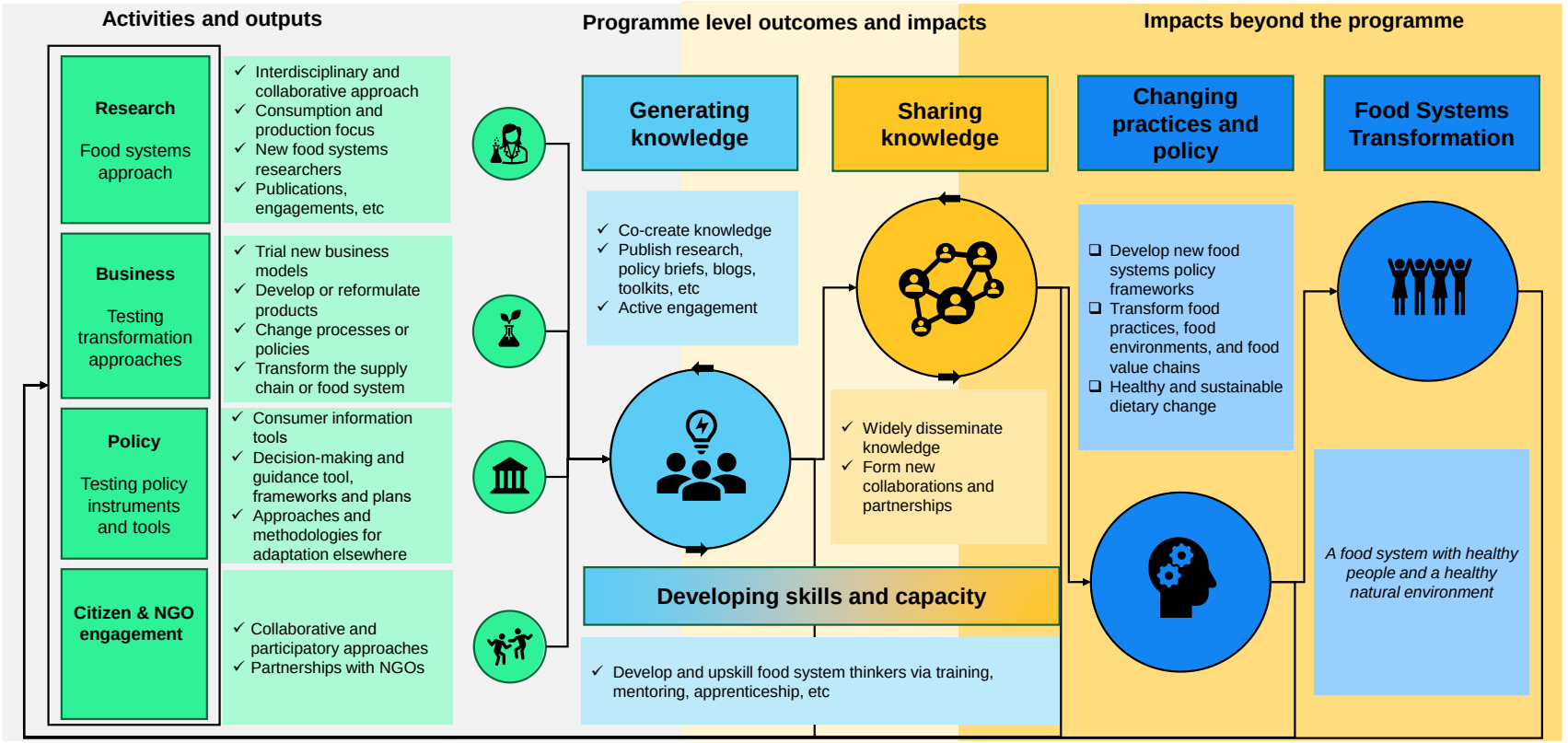
The case studies will be updated later in the evaluation process, by which time most projects are expected to be completed, and more evidence available. The eight case

studies examined complex topics and issues within a limited scope (in terms of the range and number of stakeholders consulted and the relatively tight timescale).

1.2.3 Theory of Change

The simplified ToC (Figure 1.5) captures the programme's expected outputs, outcomes and impacts. The first two columns, in green, summarise the activities and outputs linked to each impact pathway (research, FBs, government policy, and community/citizen behaviour). The light blue and yellow boxes represent the expected outcomes and the dark blue boxes the expected impacts (some of which may be realised within the programme period and some after). The three boxes below show the key assumptions on how the programme aims to drive change. The diagram and narrative have been updated from the ToC presented in the baseline report in 2023, reflecting the reality of the TUKFS programme as of August 2024 (the Annex document provides a detailed diagram and narrative for the ToC).

Figure 1.5 The TUKFS programme ToC



Key assumptions

Generating knowledge	New knowledge is created and skills developed by interdisciplinary partnerships on how to transform the food system, across the sector (from production to consumption)
Sharing knowledge	The knowledge products created and skills developed are suitable for all stakeholders working in the food system: policy, business, citizens
Changing practices and policy	Food system stakeholders use the knowledge products created and skills developed and help transform the food system (leading to long term behaviour change across business, policy, research and citizens)

The programme is expected to have direct impacts in four main areas:

- **Skills and capacity for food systems research in the UK**. This will be a large area of impact. It includes the development of new knowledge and data related to specific interventions, as well as to food systems research more generally. TUFKS is predominantly a research programme (rather than research and development or innovation), in which projects are led by academic research staff. Impacts relate to research produced by academics, but also to skills learned by academics, FBs and policymakers involved in the funded projects.
- **Business practices**. Funded projects will explore new business models, strategies and other approaches with FB partners. This is expected to lead to changes in practice in the food value chain and food environments resulting in a healthier, more affordable and more sustainable food supply. Projects will test transformations in different stages of development. Some of their innovations will be ready to be commercialised, while others will be in the early design stages.
- **Government policy**. Funded projects intend to generate evidence or to inform development of policies, or co design local strategies with policymakers that make it easier for people to access affordable, attractive, healthy and sustainable diets. Projects are engaging with policymakers across different parts of government and at local, regional or national level, with the expectation that knowledge is transferrable to other areas or regions or may be scaled up. The biggest impact on policy is likely to be through policymakers' involvement in the funded projects, and their use of food systems approaches in evidence based policymaking that supports resilient and sustainable food systems, and an affordable healthy diet for all consumers – including lower income communities.
- **Community/citizen behaviour**. Transformation of communities (beyond specific stakeholders) is another anticipated impact. The programme aims to encourage citizens to take an active part in transforming their local communities to create healthier and more sustainable food environments. Changes to policy and practice should, in turn, change public awareness and consumption patterns.

Although these impacts are considered separately in the evaluation, they are likely to impact one another. For example, changes in policy may encourage FB behaviour change. This may be due to an increase in public awareness. These interactions are also represented in the model.

1.3 Purpose of this document

This interim impact evaluation report is the second deliverable of the evaluation. It presents the summary findings from the third phase of the evaluation conducted between February and July 2024. The report provides early findings on the impact evaluation questions and discusses programme progress along the pathway to impact, including an assessment of outputs and some early outcomes arising from individual projects and the programme overall.

The evaluation has 11 questions to address. To avoid repetition, these have not been answered individually. Instead, the report has been structured based on the TUKFS programme ToC, drawing on evidence emerging directly from the programme's design and implementation, as well as its funded activities (e.g. contributions that individual funded projects make to specific impact pathways that contribute to the wider impact).

Table 1.2 provides a summary of the evaluation questions, along with the sections of the report that answer them.

Table 1.2 Report sections in which evaluation questions are answered

Impact evaluation questions	Relevant sections
1. To what extent has the programme supported high quality research and knowledge generation, with the UK at the forefront of food systems research?	2.2, 2.3, 2.4 and 2.5
2. To what extent has an interdisciplinary, cross stakeholder approach generated new knowledge and evidence relevant to multiple stakeholders?	2.2.4, 2.3, 2.4 and 2.5
3. To what extent have production and consumption, and their interdependencies, been integrated into the research?	2.1, 2.2.2 and 2.2.4
4. To what extent has the programme developed new and lasting partnerships?	2.2.4
5. How effectively has the programme developed a pipeline of skilled people able to apply critical, interdisciplinary systems thinking to the food system?	2.2.3
6. To what extent has new knowledge been created through programme level engagement and synthesis, notably on food systems transformation?	2.2.2 and 2.2.4
7. To what extent is a food systems approach being taken by FB stakeholders?	2.3
8. To what extent have new knowledge and trial interventions informed the policy and practice of FB stakeholders?	2.3
9. To what extent is a food systems approach being taken by policymakers (who are engaged in the projects)?	2.4
10. To what extent have new knowledge and trial interventions informed government policy and practice?	2.4
11. How effectively has the programme developed and translated new knowledge to help transform UK diets to be healthier, more sustainable and more accessible, linking back to UK food production and supply?	2.5

The remainder of this report provides:

- a summary of the findings for the impact evaluation (section 2and supporting Annex document); and
- a concluding chapter (section 3).

2 Main findings

This section presents the main findings of the evaluation.

2.1 The TUKFS programme design has been effective at supporting delivery of the programme's objectives

The TUKFS programme is providing funding for food systems research at a scale that is unprecedented in a UK context.

The baseline assessment,[11] as discussed in section 2.2.1, found that the TUKFS programme is the largest food systems research programme in the UK to date and one of the few available programmes globally.

Food systems research is characterised by multi and interdisciplinary working. The report uses 'discipline' to mean a body of specialised knowledge, as defined – at this point in the study – by the researchers themselves (e.g. by how they defined it in their application documents and subsequent conversations with the evaluation team).

'Multidisciplinary' refers to different disciplines working together, but the interpretation of the results often happens at a later stage, from the perspective of one discipline. The report uses the term 'interdisciplinary' to describe the integration of different disciplinary data, methods, tools, concepts and theories to create one common understanding. To encompass both, the evaluation team has adopted the term MIDRI, as used in a study completed for the Strategic Priorities Fund.[12] This encompasses multidisciplinary approaches, as well as 'more integrated interdisciplinary approaches, and cross sector collaboration'.

The MIDRI term highlights that multidisciplinary and interdisciplinary approaches are needed to contribute to improved research outcomes when addressing complex problems (e.g. climate change, health or food issues).

TUKFS has design and implementation mechanisms that align, to some extent, with its five objectives (Table 2.1). Its design and delivery are on track to accomplish the last three objectives. The first two objectives are highly ambitious and aspirational; as such, it is not an expected that they will be achieved within TUKFS' lifetime. Nevertheless, the programme is contributing to their progress.

The impact generated by achieving the objectives will depend on how well the TUKFS programme management team is able to synthesise and disseminate the knowledge generated through the programme's activities, and the extent to which it is used. Table 1.2 summarises the mechanisms put in place by the TUKFS programme to achieve each objective.

[11] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

[12] https://beta.ukri.org/wp-content/uploads/2022/07/UKRI-190722-StrategicPrioritiesFundBaselineInterimProcessEvaluation-TechnicalReport.pdf

Table 2.1 Alignment of the programme's design and delivery with its objectives

Programme's objectives	Programme design and delivery
1. Transforming UK diets to be healthier and more sustainable	■ The programme was co-funded by Defra. It was co designed with Defra, and a wide range of stakeholders (FB, policymakers and civil society) ■ TUKFS programme design considers established UK food system challenges and is aligned with the UN Sustainable Development Goals.
2. Changing the behaviour of actors across the food system, from production to consumption	■ The programme was designed to change the behaviour of stakeholders engaged in the funded activities as partners, and to influence food system stakeholders via knowledge generated by TUKFS. ■ TUKFS embedded collaboration as a key element of the funding criteria. This allowed all activities to collaborate beyond academia. ■ TUKFS is also enabling collaborations beyond project activities
3. Modelling interdependencies across the UK food system to join up healthy and accessible consumption with sustainable food production	■ The programme embedded MIDRI and food systems approaches in the funding criteria. ■ All funded activities used a food systems approach that integrates production and consumption into research and explores their interdependencies. The TUKFS management team carried out an analysis of the portfolio of funded activities after the Call 1 awards to identify research gaps and target these with subsequent funding calls (Call 2 and Call 3). ■ The TUKFS programme management team ensured that food systems research is championed across UKRI, and that synergies were built where relevant.
4. Co-producing research between academia and stakeholders	■ Collaborative approaches were embedded in the programme's funding criteria, creating a network of over 300 partners across academia, government, business and civil society.
5. Developing a pipeline of skilled people who apply critical, interdisciplinary systems thinking to the food system	■ The CDT covers a training gap identified during the baseline research and will train 56 students.[13] ■ Further, the programme requested that all projects support ECRs and encouraged training on food systems across partners and projects.

[13] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme Process. Evaluation and Baseline Report*. Not published. Note: Since the baseline, the CDT reduced the number of students to be trained to 56 adjusting for higher than expected costs per student.

The TUKFS programme was designed (in collaboration with Defra) to consider established UK food system challenges and align with the UN Sustainable Development Goals. Earlier research conducted for this evaluation showed that its design is like that of other food systems research programmes in the EU (e.g. Food2030) and internationally (e.g. Food Systems 2030),[14] in terms of size (£47.5 million) and ways of working (collaboration, MIDRI, and using systems thinking across funded activities).

The TUKFS programme emphasises the delivery and sharing of co-produced knowledge (section 2.2.2); **a high level of MIDRI** (section 2.2.4); and **working at different geographical scales across the UK, as well as researching the entire food system from farm to fork, including its interdependencies** (section 2.2.4). Together, these features are supporting the achievement of the desired outputs and outcomes, as outlined in the ToC (Figure 1.5).

All stakeholders interviewed (70) described the TUKFS programme as a research programme that supports knowledge production at the forefront[15] of food systems research. Beyond the application process, stakeholders explained that the programme provided a unique opportunity to advance knowledge on UK food systems. It is the first research programme in the UK to provide funding at scale for interdisciplinary research on food systems thinking, and to address the complex challenges that the food system faces. Interviewees agreed that the TUKFS programme had attracted many high quality applications (with a 10% success rate compared to 25% for the Strategic Priorities Fund overall)[16].

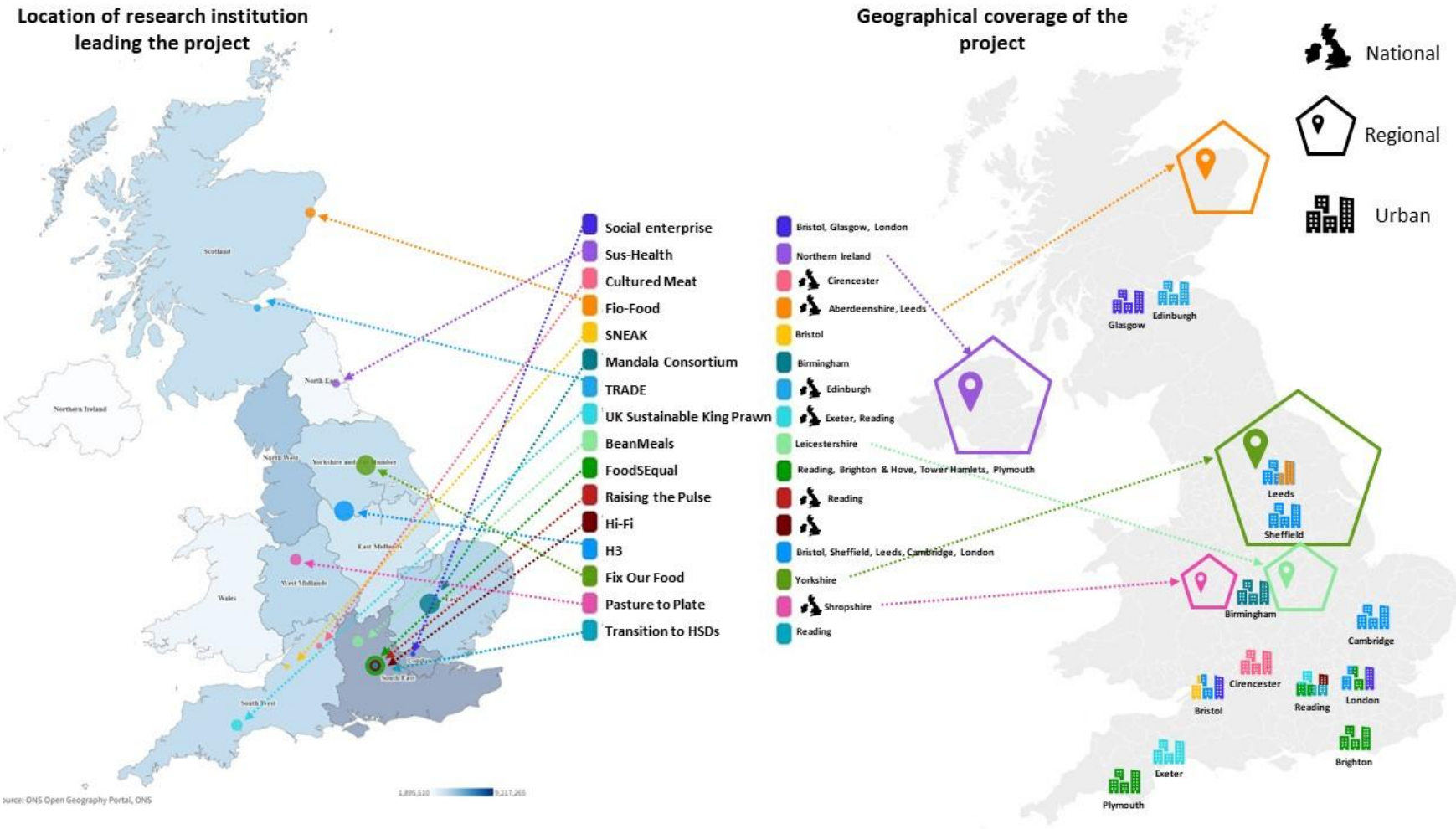
The TUKFS programme funded 16 projects, as well as the CDT and knowledge exchange activities. The 16 funded projects are spread across the UK, with 13 projects distributed across regions in England, 3 in Scotland and 1 in Northern Ireland. Seven projects have a UK focus. None directly targets Wales (Figure 2.1).

[14] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

[15] The final report will include a bibliometrics analysis of TUKFS publications. For the interim report, the team has used qualitative indicators to assess whether the research produced is at the 'forefront' of food systems research: stakeholders (TUKFS and non-TUKFS) indicate research produced is high quality and UK reputation in food systems research has improved.

[16] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

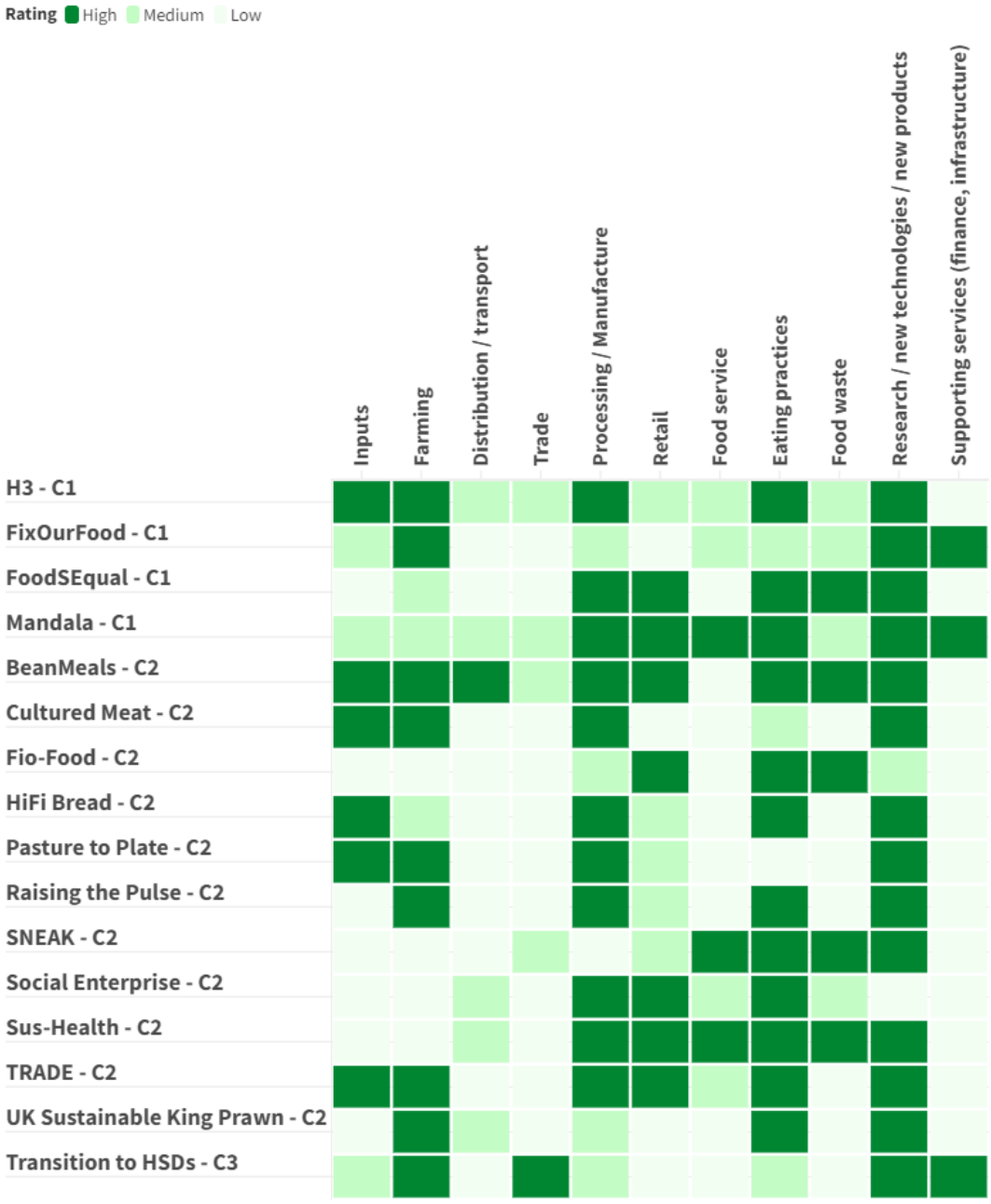
Figure 2.1 Location of projects funded by the TUKFS programme



Source: Document review

The activities also explore the food system at different levels – from local to regional to national – and set different boundaries within the food system they are exploring (Figure 2.2)[17]. Some defined the food system in relation to a specific food product, while others explored elements of the supply chain, an entire city's food systems, or took a narrower focus (e.g. consumer behaviour in restaurants or university canteens). All projects are aligned with National Food Strategy (2021) objectives[18].

Figure 2.2 Focus of TUKFS projects across the food system



Source: Authors' desk research

[17] The analysis focuses on the projects, as many of the CDT students do not have a topic yet and the other activities promote knowledge exchange.

[18] https://ukfoodsystems.ukri.org/our-activities/

The evaluation team's analysis of the project portfolio identified some areas not covered by the programme that could be considered for future research. These are:

- Supply chain inputs: research on seeds, pesticides, water or other inputs required to grow food. This includes animal feed and antibiotics.
- Trade, distribution, transport and food transformation (the latter is often described as the 'missing middle' in food systems research, and it tends to be underrepresented in the funded projects).
- Research that is 'beyond food' but related to it (e.g. labour conditions in the food system, diversity and trust, and power imbalances in the supply chain).
- Understanding some human behaviour, sustainability and health impacts related to ultra-processed foods (UPF). While several projects are working on consumer behaviour and retail strategies, the UPF element appeared to have received limited attention.

The CDT – a key activity of the TUKFS programme – is training doctoral researchers in food systems approaches. The CDT teaching approach builds on common elements used across other types of food systems training, such as Interdisciplinary Food Systems Teaching and Learning[19], and the Agriculture, Nutrition and Health Academy[20]. The CDT is designed to carry out interdisciplinary teaching, balance theory with practice and focus on systems approaches. The TUKFS programme has also encouraged all funded projects to work with and train early career researchers (ECRs) (section 2.2.3). The programme also encourages researchers to train stakeholders as part of their research projects and disseminate food systems thinking beyond programme activities by integrating it into their teaching, applying to new funding opportunities, sharing their knowledge at workshops and conferences, and mentoring others.

The TUKFS programme is enabling partnerships and collaborations beyond project activities. The Director's budget supports knowledge exchange and collaboration, including coordination meetings with Call 1 PIs, regular workshops, nine special interest groups, and the TUKFS programme annual meetings.

The budget is also used for *ad hoc* funding to help achieve impact and ensure synergy across the portfolio. The TUKFS programme published six papers when it began. It also has two separate funds to support collaboration and knowledge exchange across programme activities: a Synergy Fund (eight projects funded with up to £25,000 each) and a Flexibility Fund (one project funded with up to £10,000).

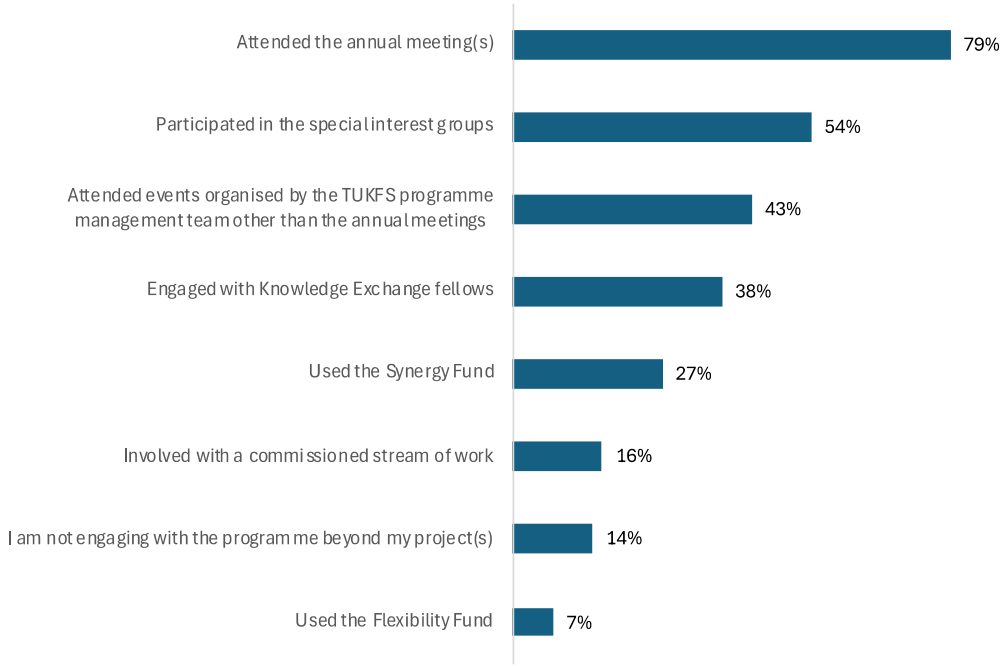
The project survey responses showed that projects are engaging with the knowledge exchange and collaborative activities. More than half the academic respondents engaged with TUKFS programme activities funded via the Director's budget by attending the annual meetings (79%, 44 of 56) and participating in the special interest groups (54%, 30 of 46)[21]. Fewer had been involved with a commissioned stream of work (16%, 9 of 56) or used the Flexibility Fund (7%, 4 of 56). Figure 2.3 summarises the ways in which project participants have engaged with these activities.

[19] https://www.ifstal.ac.uk/

[20] https://www.anh-academy.org/anh-academy/about-anh-academy

[21] These included special interest groups based on topic areas (e.g. urban agriculture, regenerative agriculture, supply chains and health inequalities), alongside research method groups (e.g. creative and participatory methods, data and modelling, and evaluation).

Figure 2.3 How have you [project participant] been engaging with the TUKFS programme beyond the project(s)?



Source: ICF/Technopolis survey (N=56; PIs/project coordinators and academic partners)

The TUKFS programme management team has ensured that food systems research is championed across UKRI, and that synergies are built where relevant. For example, UKRI invested an additional £1.8 million in existing TUKFS programme research projects to expand their health inequalities work. The management team has shaped additional funding calls on the topic, to ensure that they build on the work being done as part of the TUKFS programme.

To amplify the impact of individual funded activities, the TUKFS programme has funded knowledge exchange activities to support the generation of food systems transformation knowledge at programme level, through collaboration between project teams and synthesis of their collective insights (section 2.2.5).

2.2 The TUKFS programme supports high quality research, knowledge generation, and increased skills and capacity for food systems research in the UK

The TUKFS programme has enabled an increase in capacity and capability for food systems research by:

- supporting research and knowledge generation, with the UK at the forefront of food systems research and delivering diverse, co-produced knowledge outputs;
- developing a pipeline of skilled people able to apply critical, interdisciplinary systems thinking to the food system;
- enabling food systems approaches (MIDRI, cross stakeholder, and integrating food production, consumption and their interdependencies into the research) to generate high quality knowledge and evidence relevant to multiple stakeholders;

- creating new knowledge through programme level engagement and synthesis on food systems transformation.

Box 2.1 summarises the key findings.

Box 2.1 Key findings – increased skills and capacity for food systems research

- The TUKFS programme is making progress in generating research and co-produced knowledge at the forefront of food systems research. It has funded 16 research projects focused on food systems transformation that involve more than 300 researchers, including 130 ECRs.
- The CDT is the first centre to offer focused food systems, interdisciplinary, post graduate training in the UK. The CDT and funded projects are developing a pipeline of skilled people able to apply critical, interdisciplinary systems thinking to the food system, with 56 PhDs trained by the CDT and 14 PhDs funded by the research projects.
- The innovative programme design attracted food systems projects that are contributing towards TUKFS objectives: 89% of CDT students that responded to the survey agreed that the CDT had enhanced their understanding of food systems and helped them become familiar with multiple disciplines.
- ECRs are applying for related funding opportunities. CDT students expect to apply knowledge and approaches in future research and non research roles.
- All the activities are delivering cross cutting food systems approaches that are collaborative and MIDRI. They have published 92 academic outputs and 17 non academic outputs including blogs, toolkits, etc reported. The funded projects are also disseminating knowledge in various forms: 715 engagements, 191 collaborations, 85 policy influence. It is expected that many outputs (e.g. journal publications) and outcomes (e.g. influencing the research community) from projects will be finalised after the programme ends. However, there are no plans to disseminate these at programme level after TUKFS finishes in 2026.
- TUKFS currently has a network of 311 diverse stakeholders as project partners. New collaborations and partnerships have been formed, and many intend to continue after the programme ends.
- The TUKFS programme is building a valuable food systems community for many stakeholders, but there are no plans to support it after the programme ends.

2.2.1 Baseline

The *ex-ante* (pre TUKFS) situation for food systems research and training on food systems research showed that the funding available for food systems was small, that there were no food systems doctoral research programmes in the UK when TUKFS was launched, and that funding mechanisms do not traditionally encourage MIDRI or collaborative research applications.

The baseline report[22] found that the funding landscape in the UK, EU and internationally for food systems research uses two main types of funding: traditional funding mechanisms for research projects (with smaller budgets) and targeted

[22] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

funding for food systems programmes. The baseline identified only eight food system programmes from the UK, EU and internationally operating within the last 10 years that explicitly used a food systems approach[23]. Only one, N8 Agrifood, was based in the UK (it had a budget of £16 million). The other identified programmes are all multi year and have a large budget (£16m to £43m GBP equivalent, i.e. similar in scale to TUKFS)[24].

Some food systems related training was available as of 2023, and the offer had been growing in recent years. The format of the training varied but most options offered short term or master's level training. There were two multi stakeholder platforms (the Interdisciplinary Food Systems Teaching and Learning (IFSTAL) and the ANH Academy) that delivered comprehensive food systems training targeting doctoral students and ECRs. As of 2023, no available PhD programme took a 'food system' approach, offering interdisciplinary teaching, balancing theory with practice, and focusing on systems approaches.

2.2.2 The TUKFS programme is making progress in generating research and co-produced knowledge at the forefront of food systems research

The TUKFS programme is contributing in different ways to increasing knowledge at the forefront of food systems research. The funded activities have generated a diverse range of outputs (in terms of volume and type) across the UK food system. The evaluation has not yet systematically assessed the quality[25] of the knowledge generated, or whether the knowledge is being recognised internationally. Interviews with the programme coordinator and project leads indicate ongoing plans for publications in prestigious international journals including Nature.

The TUKFS programme has funded 16 research projects that focus on food systems transformation. These research projects emphasise academic and non academic outputs that are co-produced and interdisciplinary to ensure that knowledge is accessible to all relevant stakeholders (see Table 2.2 highlighting the diversity and scale of outputs). They all build on existing work published in the UK and internationally.

As discussed above, the baseline report[26] found that, while food systems research funding gained attention in the last five years (2019 to 2023) worldwide, when the TUKFS programme started, the funding available for food systems research was small. A 2023 study focused[27] on research and development (R&D) funding for food systems in the EU found that only 4% (€4.8bn) of total EU public funding available under the 7th Framework Programme for Research (FP7) and Horizon 2020 (H2020)

[23] A summary of the programmes can be found in Table A5.1 (Annex document).
[24] It was not possible, within the scope of this exercise, to undertake a comprehensive mapping of all potentially relevant international programmes. However, using a purposive selection strategy, the team reviewed the portfolio of major international funding bodies to identify these programmes.
[25] The ResearchFish data captured as of March 2024 did not provide enough academic publications to conduct bibliometrics analysis to assess their quality and reach. Bibliometric analyses are planned for the last phase of the evaluation. The assessment of the quality of the knowledge in this report is based on stakeholder interviews, survey data, and the authors' review of the TUKFS programme's outputs compared to the baseline data on food-systems research programmes.
[26] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.
[27] Directorate-General for Research and Innovation (2023). Food systems: Research and innovation investment gap study. Available from: https://research-and-innovation.ec.europa.eu/knowledge-publications-tools-and-data/publications/all-publications/food-systems-research-and-innovation-investment-gap-study_en.

was allocated to food systems related projects. This study, and other studies[28,29], signalled that there is a food systems R&D investment gap. Further, the baseline[30] identified only one food systems research programme based in the UK (N8 Agrifood programme) and that ended in 2021. The TUKFS programme was therefore a strategic response to address food system challenges in the UK by UKRI.

Analysis of project activities shows that the TUKFS programme and its funded activities are working towards the development of a strong corpus of evidence on how to transform the UK food system. Projects are testing different types of interventions, from on farm transformations to innovative products and behavioural change interventions targeting a diverse range of consumers. Several projects are gathering evidence and data that will enhance understanding of the food system, the levers that can effect change, and the different pathways to impact. This includes the development of new metrics and models to measure the environmental, health, social and economic impacts of the different interventions tested to help drive transformations in the UK food system (Box 2.2).

Box 2.2 Examples of knowledge about food systems transformation being generated by projects funded by the TUKFS programme

Test interventions to gather data to ground approaches in evidence

The SNEAK project is testing a behaviour change model in a real life setting: a university canteen. The model tests the impact that changes in menus can have in guiding consumers towards food choices that are healthier and have smaller environmental impacts, without compromising food acceptability, and without consumers being aware of the process.

Evidence and data to help us understand the food system

H3 is mapping pathways for the transition to healthy and sustainable diets in the UK that involve changes in food production. For example, H3 has co designed regenerative agriculture approaches with farmers and researchers to test them and gather evidence on their environmental outcomes, as well as their crop productivity.

Development of new metrics and models to measure environmental, health or other outcomes

The UK Sustainable King Prawn Project is building a model to test the technological and commercial viability of indoor production of shrimp on terrestrial farms in the UK, enabling farmers to supplement their income while also supporting the conservation efforts that farms may be required to make.

Source: Case study 1 and document review

The portfolio of research activities has already produced a range of diverse knowledge outputs that are expected to reach a wide range of audiences. ResearchFish data (March 2024)[31] showed that funded projects have produced 1,104 outputs of different types (Table 2.2). Annex A.1 provides further details on the ResearchFish methodology.

[28] Rosegrant, M. W., Sulser, T. B., & Wiebe, K. (2022). Global investment gap in agricultural research and innovation to meet Sustainable Development Goals for hunger and Paris Agreement climate change mitigation. Frontiers in Sustainable Food Systems, 6, 965767.

[29] den Boer, A. C., Kok, K. P., Gill, M., Breda, J., Cahill, J., Callenius, C., ... & Broerse, J. E. (2021). Research and innovation as a catalyst for food system transformation. Trends in food science and technology, 107, 150-156.

[30] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

[31] Most (15 out of 16) projects reported outcomes in their ResearchFish submissions to date. ResearchFish data uploaded by TUKFS were in most cases already curated by project coordinators and PIs which resulted in limiting uploads of duplicate entries (e.g. FixOurFood coordinator collects outputs on engagements periodically and then uploads the database into ResearchFish).

ResearchFish data from 2025 are expected to provide a more representative picture of the outputs delivered by each project. None of the projects had been completed at the time of the ResearchFish submission in 2024. Three projects (Social Enterprise, Cultured Meat, and Beanmeals) end in 2024, and the others will end between 2025 and 2026.

Table 2.2 TUKFS programme projects: reported numbers of key outputs

Performance indicator (n = 15 projects, £36m)	Engage-ment	Collabora-tions	Publi-cations	Policy influence	Creative products	Research Materials, databases and models	Total
Total number of outputs	715	191	92	85	17	4	1,104
No. of projects reporting outputs by type of output	14	9	10	4	6	3	15

**The number of outputs is expected to increase and therefore the ratios are likely to improve over time.*
Source: ResearchFish data analysis, August 2024

The funded projects reported the following outputs on ResearchFish:

- 92 publications, including two in *Nature Food*[32,33], 75% of which were academic journals/conference proceedings and 25% with broader focus such as books, consultancy reports and policy briefings.
- 191 collaborations, of which the majority appears to be from project partners outside the original applications (88% of collaborator's names do not match names of partners on the original partner lists).
- 715 engagements, of which 98% focused on audiences outside academia. This meant engaging the public directly or through media (34%), professional practitioners and policymakers (30%), FBs and CSOs (11%). These engagements included specific dissemination activities (conferences, seminars and webinars), as well as co-produced outputs with non academic stakeholders, such as blogs, toolkits or policy briefs designed to influence behaviour, demonstrate effective practices in different contexts, and contribute data towards evidence based actions.
- 85 cases of policy influence, the majority of which (66%) were participation in advisory committees and contributions to national consultations/reviews and nearly a quarter (24%) were contributions to or influences of professional practice.
- 17 creative products, over a half of which (59%) were video/animation content, and the rest a combination of infographics, logos, an interactive game for children and a set of poems.
- 3 research materials/models (e.g. data analysis methods better enabling co production) and one database of primary school meals.

The ResearchFish analysis shows that the current mix of research outputs produced by the TUKFS programme is diverse, with a stronger prevalence of engagements and collaborations compared to journal articles. While TUKFS has been running

[32] Doherty, B., Jackson, P., Poppy, G.M., Wagstaff, C. and White, M., 2022. UK government food strategy lacks ambition to achieve transformative food system change. *Nature Food*, 3(7), pp.481-482.
[33] Faccioli, M., Law, C., Caine, C. A., Berger, N., Yan, X., Weninger, F., Guell, C., Day, B., Smith, R. D. and Bateman, I. J., 2022. Combined carbon and health taxes outperform single-purpose information or fiscal measures in designing sustainable food policies. *Nature Food,* 3(5), pp.331-340.

since 2021, it is expected that research outputs will take a longer time to be generated (MIDRI and co-produced research can take longer to generate programme outputs than is typical for traditional research programmes). It can, however, lead to higher impact in the longer term[34,35,36] because there are additional costs and challenges associated with a MIDRI approach: startup costs are higher, and it takes time and effort to get researchers from different disciplines to understand and work with each other. There are also challenges related to the dissemination of MIDRI research, including where to publish and present research outputs, given the lack of interdisciplinary journals and conferences. On the other hand, it is expected that TUKFS will have a high number of collaboration and engagement type outputs, which explains the ResearchFish results detailed above.

There is currently no evidence on whether the UK is being recognised as world leading in food systems research. However, the evidence collected from the survey and the interviews with all project PIs and the TUKFS programme management team confirms that participants are planning to produce relevant, high quality knowledge outputs, and publish in prestigious international journals. The final stage of the evaluation will explore the quality of publication outputs.

2.2.3 The TUKFS programme is developing a pipeline of skilled individuals able to apply critical, interdisciplinary systems thinking to the food system

The baseline report[37] identified several food systems training initiatives that predate the TUKFS programme. However, these initiatives tend to target master's students or professionals and are typically short term (e.g. summer schools or online courses). The TUKFS programme is addressing the gap in food systems training at the doctoral level through the UK Food Systems CDT and by encouraging the funded projects to actively support and involve ECRs in their activities.

The CDT is funding 56 students across three cohorts to develop the skills needed to carry out food systems research and drive transformation. The CDT is delivered by a consortium of universities that support and facilitate interdisciplinary working. The four year programme requires students to combine natural sciences and social sciences in their research and presents opportunities to collaborate with FBs, government and civil society.[38] It is beyond the scope of this evaluation to provide a detailed analysis of individual CDT students' research projects, current progress or risks of not completing their studies. An overarching view on these aspects can be examined at the next stage of the evaluation.

Just under half of the students surveyed said that they had either not used or heard of a 'food system approach' before applying to the CDT (44%, 12 of 27). Only two students surveyed said that they were 'completely confident' in using food system approaches before enrolling in the programme.

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[34] Davé, A. et al., 2016. *Landscape Review of Interdisciplinary Research in the UK*. Report to HEFCE and RCUK by Technopolis and the Science Policy Research Unit, University of Sussex.

[35] Sun, Y., Livan, G., Ma, A. et al., 2021. *Interdisciplinary researchers attain better long-term funding performance. Commun* Phys 4, 263 https://doi.org/10.1038/s42005-021-00769-z=

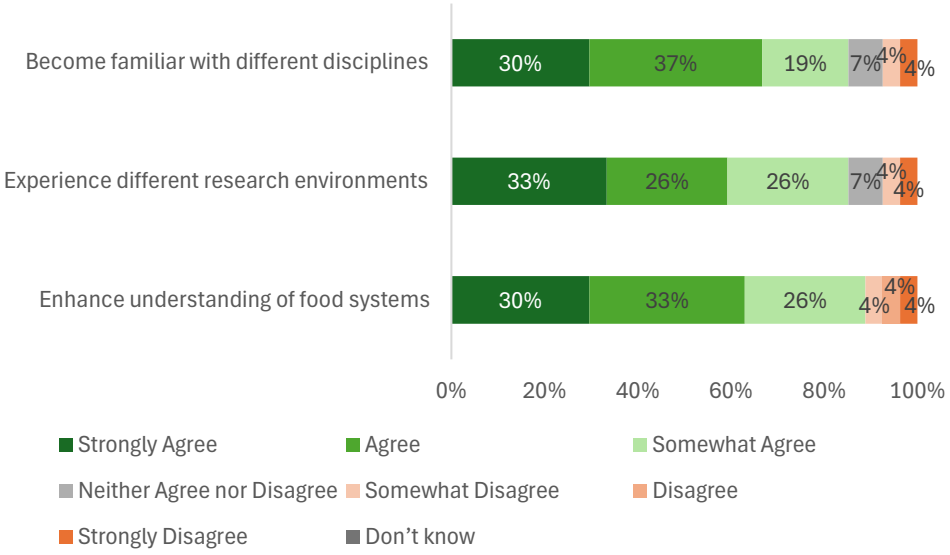
[36] Purvis, B., Keding, H., Lewis, A. and Northall, P., 2023. *Critical reflections of postgraduate researchers on a collaborative interdisciplinary research project*. Humanities and Social Sciences Communications, 10(1), pp.1-13.

[37] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

[38] https://foodsystems-cdt.ac.uk/doctoral-programme

Figure 2.4 shows that most of the students surveyed agreed that participation in the CDT programme had enabled them to enhance their understanding of food systems, become familiar with different disciplines and experience new research environments.

Figure 2.4 To what extent do you agree that participation in training and development opportunities of the CDT programme has allowed you to do the following?



Source: ICF and Technopolis survey of CDT students (N=27)

After completing the CDT programme, most students surveyed (70%, 20 of 27) expect to apply their knowledge and interdisciplinary approaches to tackle food systems challenges.[39] Those who know or have some idea of their career goals after the programme (81%, 22 of 27) expressed an interest in pursuing careers across various sectors, including research centred academia (54%, 12 of 22), international organisations (54%, 12 of 22), FBs (45%, 10 of 22), government stakeholders (45%, 10 of 22), and CSOs (45%, 10 of 22).[40] Over half of the respondents indicated an interest in multiple career paths.

The evidence presented is not intended to provide a full assessment of the effectiveness of the interdisciplinary working. At this stage, the survey results indicate that the CDT programme is effective in enabling students to develop new research skills, exposing them to new disciplines, and enhancing their understanding of food systems approaches. A more thorough analysis of individual studentships and student perceptions can be incorporated at the next evaluation stage.

Active involvement of ECRs in the project work packages is increasing capacity and capability for food systems research. Our beneficiary survey suggests that there are 130 ECRs involved in project activities across the whole portfolio, and they play key roles in data collection, analysis and dissemination.[41]

[39] No additional information was collected where respondents said that they expect to apply their skills in a non-food system environment.

[40] Responses do not add up to 100% because respondents were allowed to select multiple options.

[41] Due to the nature of the survey and monitoring information available, it is possible that some of the numbers are under-represented and that others may involve a level of double counting. For example, the survey answers on how many PhD candidates were funded by each project added up to 13, while the review of project websites

Through partnerships with FBs and policymakers, ECRs are gaining real world insights about the complexities involved in food systems transformation. For example, some ECRs were involved in working with local councils to support the development of local food strategies.

ECRs are regularly included in project dissemination plans to ensure that their contributions are recognised in publications and encouraged to present their work at conferences. ECRs receive training and support on how to access grant funding and make small grant applications through the programme's Synergy Fund and other sources. Interviews with project PIs suggest that ECRs are applying to secure further funding in food related projects to continue similar research and transition to becoming independent researchers.[42]

Programme participants are more confident in their ability to use a food system approach. More than half (53%, 30 of 56) of researchers surveyed for the evaluation indicated that they had not previously used a food systems approach in their research and only 10% expressed confidence in using a food systems approach before participating in the programme. The evidence suggests that most academic partners (82%, 46 of 56) are more confident in their ability to use a food systems approach because of participating in the programme and are more confident in their ability to work in interdisciplinary teams (77%, 43 of 56). Most of the non academic partners (70%, 16 of 23) indicated that they are either slightly or much more confident in their ability to use a food systems approach because of becoming a partner in a TUKFS project.

Programme participants expect their projects to have an impact on research capacity and skills to address future food related challenges. Survey respondents said that it is extremely or very likely that the projects will generate high quality research and knowledge on food systems transformation (86%, 42 of 49). Most project participants surveyed also expect their projects to increase capacity and skills to address future food related challenges through the creation of new partnerships (76%), and the production of non traditional academic research outputs[43] (72%). Fewer respondents expected their projects to develop a generation of food system thinkers (47%). The projects' academic participants are primarily involved in research activities, so it is understandable that they expect to see impact through tangible outputs in the first place. Shaping a generation of food system thinkers, on the other hand, is a highly ambitious, long term goal that at this stage is still a somewhat abstract concept.

The evaluation team found that almost a third of the academic partners surveyed said that they intend to provide training sessions (30%) and introduce food systems approaches to teaching curricula (29%) as a way of communicating their findings. These are activities that go beyond the scope of the programme. The FixOurFood project, for instance, is designing a new module at the University of York, called 'The Future of Food', in which students work with the university team managing the procurement of food and together map the local food system.[44]

added up to 14 PhD candidates for Call 1 projects only; and if we limited the number of ECR responses to the PIs, these would be reduced to 87 ECR responses.

[42] Case study 1 provides further detail on participants' mobility and building capacity beyond the project.

[43] Examples of non-traditional academic outputs include social media campaigns, blogs, policy briefs, toolkits and capacity-building materials, databases, and other output not intended for publication in peer-review journals.

[44] https://www.york.ac.uk/students/studying/manage/programmes/module-catalogue/module/ESA00001I/2023-24

2.2.4 The TUKFS programme has delivered cross cutting food systems approaches that are collaborative and interdisciplinary

The food systems approach taken by the TUKFS programme aims to gather evidence on interdependencies across the UK food system. The objective is to join up healthy and accessible consumption with sustainable food production, linking datasets to improve decision making, identify win-wins, manage trade offs and avoid unintended consequences. The TUKFS programme has therefore funded research projects that work across the food system to address challenges identified in the UK, resulting in an increasing uptake of collaborative, interdisciplinary and MIDRI food systems approaches.

The TUKFS programme is supporting cross cutting research that covers production and consumption and considers their interdependencies. As discussed in section 2.1, the portfolio of research funded by the TUKFS programme covers a range of activities and outcomes across the UK food system. A review of the funded portfolio based on the project methodologies, as shown in the baseline report[45], indicated that all funded projects and CDT students follow an approach that considers the food system from farm to fork, as well as its interdependencies.

One aim of the TUKFS programme is to create an understanding of what a food systems approach involves that is clear to all stakeholders involved in the funded projects. The evaluation therefore assessed whether project participants are reaching a consensus on what a food systems approach is and whether it is a successful approach for addressing UK challenges.

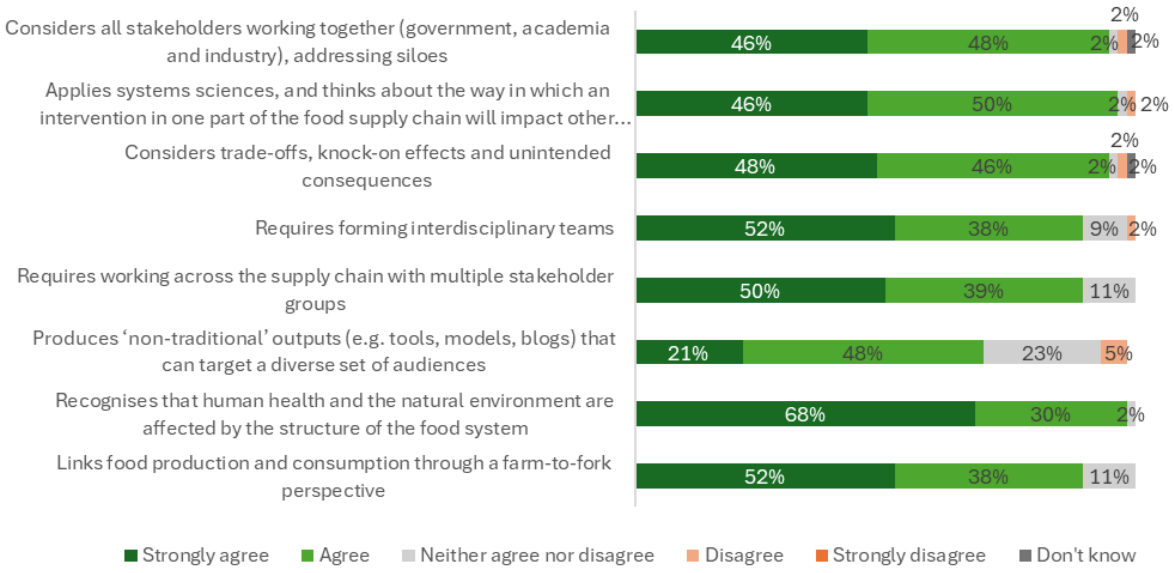
Both academic and non academic project participants largely endorsed statements about the characteristics that define a food systems approach. The statements referenced collaboration, systems thinking, MIDRI, integrating challenges, and integrating the supply and demand side elements of the food system, as well as their interdependencies. Most respondents (90% or more) agreed with all the statements provided, except 'Produces non traditional outputs (e.g. tools, models, blogs) that can target a diverse set of audiences', which had a majority support but at a lower level (73.2%) (Figure 2.5).

The following quotes, taken from survey responses, further explain why a food systems approach is essential and how the projects are applying it:

> *We are applying systems thinking and systems science tools to understand the food system, identify the leverage points for change, and generate understanding of the potential impacts of interventions on the system.*
>
> *We hope to tackle both health and environmental challenges simultaneously by encouraging people to eat less meat and replace it with more high fibre foods.*
>
> *It is essential and, in some ways, inevitable – food production and consumption are complex, and it is important to recognise interfaces and links, as none of the parts operate in isolation from each other.*

[45] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

Figure 2.5 To what extent do you agree with the following statements describing a food systems approach? A food systems approach…



Source: ICF/Technopolis survey (N=79; PIs/project coordinators, academic partners and non academic partners)

This indicates that the funded activities are undertaking research that integrates production and consumption, and their interdependencies. While all project partners agree on and consider similar principles in their research, the projects approach food systems research in different ways.

- Projects are engaging with a wide range of stakeholders (there are 311 unique partners based on the network analysis findings shown in Figure 2.6). For example, FixOurFood is engaging with farmers, retailers, policymakers and consumers. Others have a narrower focus on specific groups or sectors. For example, SNEAK sought to understand how weekly menus in the University of Bristol's canteen could be adapted to deliver a net improvement in carbon footprint and nutrient intakes, while remaining acceptable to consumers.
- Projects are taking different approaches to addressing sustainability and health and nutrition impacts. Some emphasise a comprehensive approach to sustainability and health, integrating environmental, economic and social aspects, while others focus on more specific goals such as reducing carbon footprint, or specific health outcomes.[46]
- The boundaries of the systems that projects explore also vary. Some projects take a place based approach, reviewing a city's food system to identify leverage points and evaluate interventions (e.g. the Mandala Consortium). Others approach it through the lens of a particular food category (e.g. seafood or beans) or population group (e.g. disadvantaged communities or children).

[46] 7 projects intend to influence the consumption of a specific food group (4 involve the introduction of a new food product to market and 3 aim to expand consumption of an existing product). 3 projects are researching consumer behaviour. 6 projects aim to change the entire system, starting either from a consumer perspective or a supply perspective (2 explore community based research to find innovations and make improvements to the food system, and 4 aim to transform the supply of specific healthier products).

Overall, these different approaches highlight the diversity of priorities that exist in food systems research. Each project brings its unique perspective and focus, contributing to a richer understanding of food systems transformation. However, as projects are varied, the programme may struggle to contribute to a comparable or comprehensive picture of food systems transformation. This is to be expected while conducting research in an emerging field.

The TUKFS programme is contributing to new knowledge generation on food systems with an interdisciplinary, cross stakeholder approach. A key ambition of the TUKFS programme, as a Strategic Priorities Fund programme, is to embed MIDRI in its activities, bringing together academics from different disciplines, as well as different sectors and audiences (i.e. FBs, CSOs, policymakers and citizens).

The design of the TUKFS programme means that all the funded activities have a high level of MIDRI research, resulting in MIDRI publications, synthesis and dissemination[47]. This is observed across the funded projects and CDT, and the collaborations encouraged by the TUKFS programme beyond the funded activities.

All funded projects have a high level of MIDRI as evidenced by the disciplines covered by each project, as well as self reported evidence based on the interviews with project researchers. The portfolio of funded activities covers multiple disciplines[48], with up to five in one individual project for Call 1 projects, and between two and five for Call 2 projects. At least 22 disciplines including mathematics, genetics, economics, anthropologists, biologists, etc are represented across the portfolio in total. Furthermore, the design of the CDT programme exposes its students to at least two disciplines in each of the social and natural sciences from different academic institutions.

One survey response said:

> *This programme has been a wonderful opportunity for me to work directly with researchers in public health. I work in biodiversity conservation, which tackles very similar issues and problems, with many of the same methods. I have learned a huge amount, especially about methods and research ethics. I will always be grateful.*

The case studies provide qualitative insights on the range of disciplines that have been brought together to address food challenges in the UK. Box 2.3 illustrates this.

Box 2.3 Bringing together the natural and social sciences

The UK Sustainable King Prawn Project brings together academics from the Department of Biosciences and the Department of Economics at the University of Exter to redefine the possibilities of farming warm water shrimp (“king prawn”) in the UK. The natural scientists in the project are providing the expertise to test the optimal conditions for shrimp growth (e.g., water quality, temperature, salinity, etc.) while the social scientists in the project provide expertise in modelling the supply and demand of the product to determine the feasibility and profitability of such farming practices.

Source: Case study 3

A food systems community is emerging because of the programme. The TUKFS programme has embedded collaborative working and cross stakeholder

[47] Depending on the number of outputs by the end of the programme, the team plans to undertake a bibliometric analysis to investigate the level of MIDRI and quality of academic outputs.
[48] As defined by a list of disciplines included in the survey.

partnerships across its funding programme. This has led to the creation of new networks and partnerships, laying the foundations for a food systems community. The network formed by the partners and collaborators of funded projects includes at least 311 unique stakeholders that are named and engaged across all projects (excluding CDT partnerships[49]) as of May 2024.

Funded activities are collaborating with a wide range of stakeholders across the food system. The team's network analysis identified that, of the 311 unique stakeholder organisations participating in TUKFS programme projects, more than a third (36%, 109 of 311)[50] were from the private sector, followed by CSOs (27%, 83 of 311), universities (17%, 52 of 311)[51], the public sector (13%, 39 of 311) and associations/partnerships (9%, 28 of 311) (Figure 2.6).

All projects have multiple stakeholder types as partners (3 or more), with all Call 1 projects (4 of 4) collaborating with academic partners beyond the lead academic institution, private sector organisations, public sector organisations and CSOs. All Call 2 and Call 3 projects are collaborating with private sector partners (12 of 12), and most are engaged with CSOs (10 of 12), academic partners beyond the lead academic institution (10 of 12), and/or public sector organisations (8 of 12). The CDT partnered with 17 public sector organisations, 12 CSOs and 31 private sector companies to deliver its training.

Most of the TUKFS programme partners are new relationships, and the network is growing. 71% of academic respondents stated that their project partnerships were both new and existing (40 out of 56), while 18% were entirely new (10 out of 56)[52]. Of the non academic partners, 57% responded that their partnerships included both existing and new partners, and 35% indicated that their partnerships were completely new.

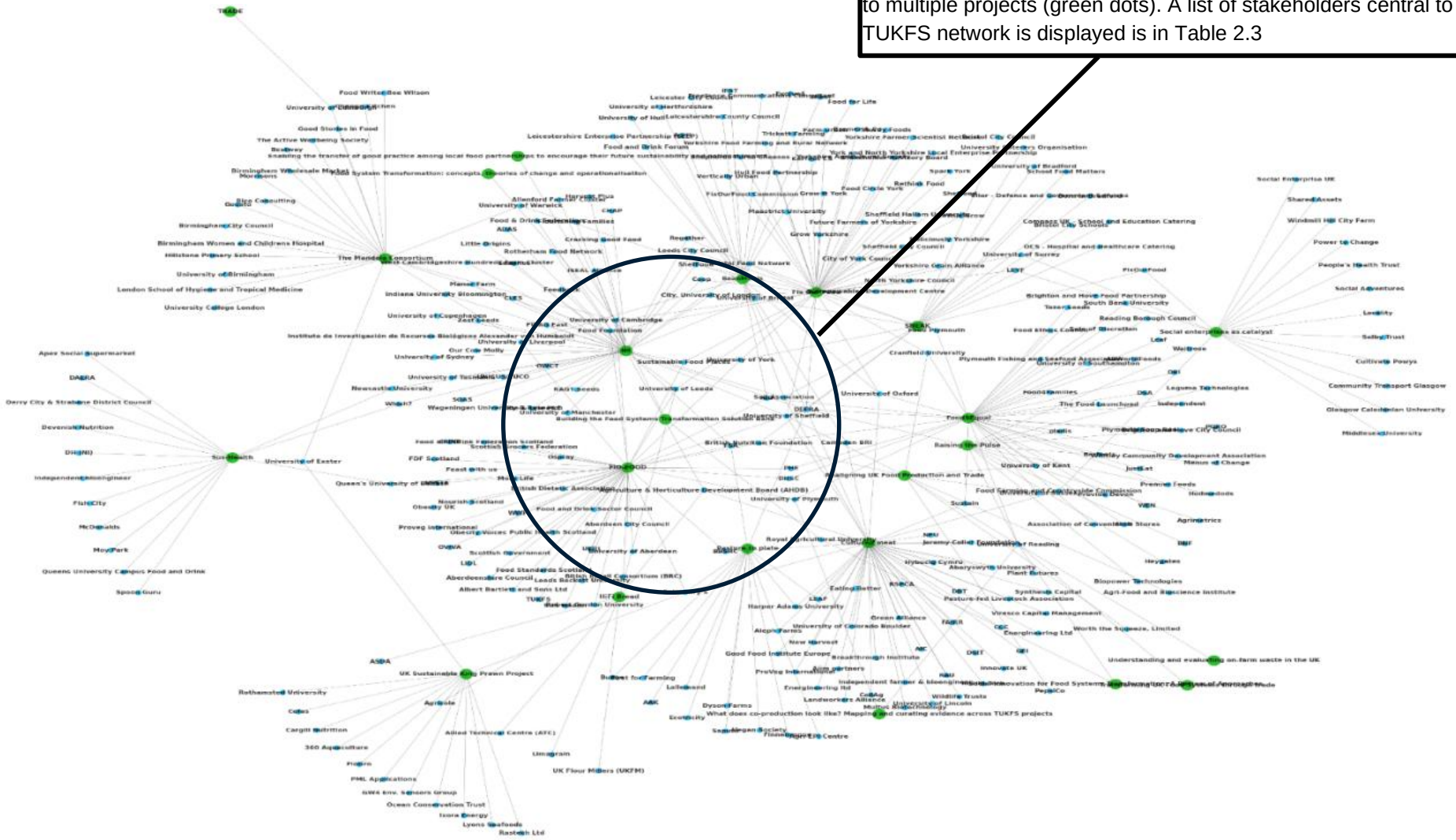
The network has changed since the start of the TUKFS programme: just over half (52%,11 of 21) of projects had recruited a new partner since the programme started. The remainder (10) indicated that nothing had changed. The network has grown significantly, from 65 organisations in 2022 to 311 in 2024, despite the addition of only one new project (a Call 3 project). This indicates that the growth is the result of existing projects adding new partners.

Projects are engaging in co production and co design methods, exposing some of their partners to new approaches. **The co production of knowledge is leading to an increased uptake of food systems approaches across stakeholders (including academics, FBs and policymakers)**. As evidenced in section 2.2.4, most academic (82%) and non academic (70%) partners are confident in their ability to use a food systems approach as a result of participating in the programme, and are confident in their ability to work in interdisciplinary teams (77% and 78%, respectively).

[49] The CDT's 2023-2024 annual report was not available for review at the time of analysis. The CDT data will be integrated into the final report.
[50] Of the total number of organisations included (not individuals), 36% represent large businesses and 64% represent SMEs.
[51] The total number of individual academic researchers participating in TUKFS projects is much higher, as often multiple individual researchers from the same university are involved.
[52] Of the 56 respondents, 6 (11%) were unclear about the extent to which the partnerships in the project were new or existing.

Figure 2.6 Transforming UK Food Systems Network Map 2023

This figure demonstrates the scale and complexity of the TUKFS network. Due to the scale of the network, it is not possible to legibly display all stakeholder names in this format. The centre of the network shows that there are key stakeholders (blue dots) connected to multiple projects (green dots). A list of stakeholders central to the TUKFS network is displayed is in Table 2.3



Source: ICF network analysis – stakeholder data from desk review, project survey results and project updates.

The ToC for the TUKFS programme assumes that greater interactions between actors representing different communities increases the odds of research results being more immediately relevant to communities outside academia. MIDRI research and co-produced publications have previously been found to be positively linked with long term funding performance, both in terms of volume and value[53], and lead to a higher policy uptake [54]. Furthermore, working in this way enables projects to ensure that their outputs are relevant to the needs of stakeholders, and delivered in an appropriate format and a timely manner.

Projects engaged in co-producing knowledge worked with a range of partners, such as farmers, CSOs, school children, people living with food insecurity and obesity, policymakers, social enterprises, retailers, and community members and groups. The most common activities across partners were:

- collaborative workshops to co design the research approach and co-write the outputs;
- co-developing internal guidelines to ensure effective collaboration during all stages of the research;
- using visual and online tools (e.g. Mural, Miro, or sharing documents online) to facilitate knowledge exchange.

Others used more innovative approaches, such as co designed games, foraging walks, or creative and participatory methods involving drawing or music. Box 2.4 illustrates some co production outputs and their outcomes.

Box 2.4 Co-production examples

BeanMeals co designed a game with schoolchildren based on their willingness to eat bean based meals. The process included tasting sessions and educational materials, and enabled children to learn more about the journey that beans take from farm to fork in the food system.

Fio-Food carried out lived experience research with people living with obesity and food insecurity and used the findings to co design retail strategies with Sainsbury's. They worked with public and patient involvement groups to ensure that people with lived experience of obesity and food insecurity had a voice in the research design and interventions tested.

Source: Case study 2

Beyond individual activities, a collaborative study across six Call 1 and Call 2 projects funded by the TUKFS Synergy Fund mapped co production for the TUKFS programme, evidencing examples of the methods used, and outputs achieved[55]. Through collaboration, projects are exposing their partners to food systems approaches (section 2.2.5 provides more detail on collaborative approaches).

[53] Sun, Y., Livan, G., Ma, A. et al., 2021. *Interdisciplinary researchers attain better long-term funding performance. Commun* Phys 4, 263 https://doi.org/10.1038/s42005-021-00769-z=

[54] Hu, L., Huang, Wb. & Bu, Y., 2024. *Interdisciplinary research attracts greater attention from policy documents: evidence from COVID-19*. Humanit Soc Sci Commun 11, 383 (2024). https://doi.org/10.1057/s41599-024-02915-8

[55] Shaw N et al. (2024) *What does 'co-production' look like for food system transformation? Mapping the evidence across Transforming UK Food Systems (TUKFS) projects*. Nutr Bull. 2024 Sep;49(3):345-359. doi: 10.1111/nbu.12690. Epub 2024 Jun 13. PMID: 38872404.

There is some evidence that the project partnerships will continue after the TUKFS programme ends. Project stakeholders believe that partnerships with all stakeholder types will continue over the next five years, with over 80% of academic partners responding to the survey that it is likely or very likely that their partnerships with academics will continue, and over 65% that their partnerships with non academics will continue. Non academic partners also indicated that they thought it was very likely (39%) or likely (35%) that partnerships would continue over the next five years. Furthermore, ResearchFish data show some evidence of additional funding raised by the projects, with four projects having received an additional £8.5 million combined (a Call 1 project received 74% of the total amount raised, and another one 20%). Further, 97% of the funding were research grants, with the largest one being a research grant for H3 for a Co-Centre for Sustainable and Resilient Food Systems (£5.8million), and the remaining ranging from £10,000 to £500,000 with an average amount of £80,000 received.

There is anecdotal evidence that some of the individual partnerships formed because of the TUKFS programme are likely to continue beyond the duration of the funding. For example, Sainsbury's (the key FB partner on the Fio-Food project) is involved in scoping and applying for additional follow on, partnership based projects with some of the academic stakeholders involved in Fio-Food. Ecotricity, an FB partner on the Pasture to Plate project, said there is 'definitely the intention to continue to engage and look at how we can take this another step further', if there is commercial feasibility.

Beyond the project partnerships, TUKFS has created a community of 311 stakeholders working on food systems. These engage with the programme at different levels. For example, the TUKFS annual meeting has had an increasing number of attendees (the last meeting had over 200 participants). Interviews with TUKFS stakeholders and programme management evidenced this achievement.

However, there is less evidence to indicate that the network of food systems stakeholders or 'community' will continue to exist beyond the life of the TUKFS programme. The programme has fostered partnerships at activity level and has been successful in creating a community of food systems stakeholders. However, the sustainability of the community beyond the life of the programme is uncertain. Evidence from the case studies and four of the key stakeholder interviews indicates that bilateral relations have been very successful and may endure over time, as evidenced by the participants' survey. Partnerships between academics are very strong, as are some of the partnerships between academics, policymakers and CSOs. FBs participation has happened more at project level than programme level, and a community formed of a wider range of stakeholders would require resources to maintain.

The network analysis (Figure 2.6) demonstrates that some organisations have a high degree of centrality. It highlights organisations that have many partnerships (degree centrality), are pivotal to the network's connectivity (betweenness centrality) and are more influential within the network (eigenvector centrality) (Table 2.3). The network analysis shows that Defra is the highest ranked organisation across all centrality measures, and the Food Standards Agency (FSA) is also highly ranked[56]. Future engagement from Defra and the FSA may help to keep the network connected.

[56] UKRI was not listed as a stakeholder in the network analysis.

CSOs that are highly ranked[57] for centrality are Sustainable Food Places, the Soil Association and The Food Foundation. This demonstrates the importance of maintaining relationships with national CSOs that are focused on food systems transformation. The centrality measures also indicate that Sainsbury's is the best connected and most influential private sector organisation. The network analysis also highlights several individuals who are well connected, influential collaborators within the network and pivotal to its connectivity. These individuals could help to keep the network together and maintain partnerships. The future sustainability of FBs partnerships may also be reliant on financial factors, including the commercial viability of new products or access to further funding.

Table 2.3 Network Analysis Results showing Degree, Eigenvector and Betweenness Centrality scores for 20 stakeholder organisations with the highest centrality scores

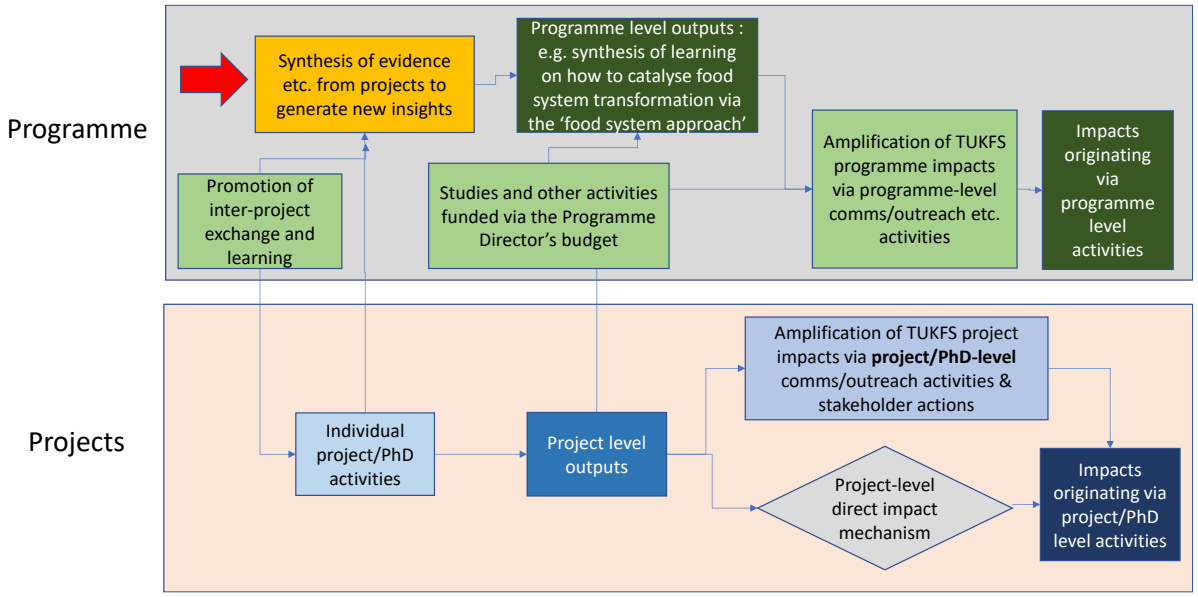
	Organisation Type	Degree Centrality	Eigenvector Centrality	Betweenness Centrality
DEFRA	Public sector	0.796	0.216	0.198
University of Cambridge	University	0.488	0.155	0.062
University of Oxford	University	0.467	0.142	0.041
FSA	Public sector	0.460	0.144	0.040
University of Sheffield	University	0.450	0.154	0.036
University of Leeds	University	0.439	0.151	0.050
Sustainable Food Places	Civil society	0.422	0.152	0.052
The Soil Association	Civil society	0.405	0.122	0.035
Agriculture & Horticulture Development Board	Association	0.401	0.121	0.053
Sainsbury's	Private sector	0.388	0.113	0.065
The Food Foundation	Civil society	0.356	0.113	0.033
Food Plymouth	Civil society	0.353	0.116	0.026
University of York	University	0.336	0.116	0.016
IGD	Association	0.325	0.096	0.015
University of Reading	University	0.325	0.089	0.019
BBSRC	Public sector	0.318	0.112	0.012
LEAF	Private sector	0.318	0.088	0.015
ProVeg International	Civil society	0.315	0.110	0.011
Cranfield University	University	0.291	0.097	0.011
DHSC	Public sector	0.291	0.095	0.011

[57] Highly ranked organisations are the top 20 with the highest centrality measures.

2.2.5 The TUKFS programme is funding activities to generate food systems transformation knowledge through programme level engagement and synthesis

At the heart of the TUKFS programme is the generation of knowledge about food systems transformation that can be used by all relevant stakeholders. This section discusses the mechanisms that the TUKFS programme has in place to ensure programme level coordination and knowledge synthesis on food systems transformation (Figure 2.7).

Figure 2.7 Impacts from Call 1 and 2 investments will be generated at project level and via programme level synthesis and communications / knowledge sharing activities



While the TUKFS programme has encouraged some level of collaboration across projects, most of the knowledge generated has been at individual project level (section 2.1 and 2.2.2).

The programme encourages collaboration and knowledge exchange between activities via the Director's budget. Box 2.5 includes examples of what these collaborations look like.

Box 2.5 Examples of collaboration across the TUKFS programme

The Food Systems Transformation and **Building the Food Systems Transformation Solution-Bank** are two collaborative Synergy Fund projects. They explore the concept of transformation in a food systems context, highlighting some of the critical aspects that need to be considered when embarking on an initiative, approach or campaign that is intended to be transformational. The findings were shared with the wider UKRI at an internal webinar.

The TUKFS annual meeting is co-hosted by the Call 1 lead universities. Three have been organised already, and the next is planned for January 2026. They are held over two days and are an opportunity to exchange knowledge, collaborate, build community, identify areas for support or professional development, and prioritise the needs of the TUKFS programme and projects.

Source: Analysis of TUKFS programme documents

Analysis of posts on the X social media platform showed that more posts referenced TUKFS programme projects individually than referenced the programme itself, suggesting that the projects are generating more discussion or interest. Still, references to the TUKFS programme in X performed better than four other EU programmes (Cities 2030, FoodSHIFT 2030, Food Trails, Fusilli, and FIT4FOOD2030) across all metrics (total number of posts, reposts, engagement and reach) (Table 2.4). This suggests that the TUKFS programme has a high level of online visibility and perceived importance when benchmarked.

Table 2.4 Overview of EU food systems programme performance using standard X metrics based on data collected April 2022 – March 2024

Programme	Total posts	Reach	Re-posts	Engagement
TUKFS	284	673,980	680	2,590
EU programmes				
Cities 2030	260	1,113,055	196	574
Food 2030	372	2,966,577	770	2,089
FoodSHIFT 2030	178	528,171	316	866
FoodE	263	1,057,341	361	934
Food Trails	15	78,140	41	100
Fusilli	56	67,337	114	327
FIT4FOOD2030	1	318	0	0
H2020	28,038	100,635,352	49,379	149,017

Source: X posts analysis

The Director's budget funds engagement activities and synthesis workshops to support programme level food systems transformation knowledge, dissemination and uptake. The programme management team advised that their focus in 2025 and 2026 will be on activities to ensure that learnings are synthesised across the programme, including:

- organising several synthesis and writing workshops with academic partners to co-write a special issue of a journal summarising the programme's key findings;
- hiring a public advocacy firm to help disseminate the most relevant findings coming out of the programme;
- continuing to support the projects with their engagement and dissemination efforts.

This combination of activities could help raise the profile of the TUKFS programme outputs.

2.3 The TUKFS programme is contributing to FBs taking up a food systems approach

The TUKFS programme has funded projects that partner with FBs to trial innovative business models and policies, products, and processes to address food systems transformation. Projects are generating knowledge on the benefits of novel and emerging processes for producing and distributing food in collaboration with FBs. They are also promoting the uptake of research outputs generated by the

programme to influence changes in the business practices of FBs involved with the programme and beyond. Box 2.6 summarises key findings and lessons learned.

Box 2.6 Key findings – Business behaviour

- The TUKFS programme has been successful in involving over 100 FBs in projects in various roles. These range from formal partners undertaking tasks and developing technology, to those involved through advisory roles and engagement, whereby FBs provide data inputs for modelling and expect to benefit from implementing the new knowledge generated in their operations.
- Partner FBs are trialling new business models, products, processes or policies to address food related challenges. This can include new models of food procurement and environmentally sustainable menus for schools or universities, and hybrid business models such as food hubs or social enterprises.
- Other forms of engagement include training FBs in new approaches (e.g. regenerative farming) and trialling, with FBs, solutions that could support more resilient and sustainable supply chains.
- There are at least nine projects where projects are partnering with FBs to develop or reformulate healthier and more sustainable food products and gather data to provide reliable and comparable information to consumers.
- FBs are being exposed to new ways of collaborating with researchers as part of the funded projects and CDT placements, namely with the opportunity to contribute to researchers' agenda and have means of directly benefitting from projects' findings. Experience from the funded projects and CDT placements may also encourage FBs to collaborate with academics and offer doctoral placements to address future challenges. In projects where FBs are working across the value chain, they may also be exposed to new ways of working from other FBs.
- MIDRI academic and industry collaborations enable academics to have meaningful engagement with FBs on real world issues allowing them to go beyond theoretical and simulated settings to test, refine and corroborate their findings. This hands on engagement enhances their understanding of industry challenges related to the production and distribution of food to help transform the UK food system in a more impactful way.

2.3.2 Baseline

The baseline report[58] found that there were several knowledge sharing initiatives, programmes and partnerships through which academics and businesses exchange knowledge relating to food systems transformation in the UK. The number of initiatives had grown in recent years, indicating a growing interest in the area. However, as of 2023, the baseline report found that existing levels of research, development and innovation related to food systems could be higher in certain areas or better aligned to the Sustainable Development Goals.

2.3.3 TUKFS projects are actively collaborating with FBs

At least 107 FBs are involved in the 16 TUKFS programme projects, with five involved in two or more projects. The number of FB partners in a single project range from one (Social Enterprise) to 16 (FoodSEqual). Only one of the projects does not formally include an FB partner.

[58] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

Some FBs are core partners actively involved in the research, while others have smaller roles, such as participating on an advisory board or contributing to specific elements of a project. Interviews with PIs and project partners suggest that beyond formal partnerships and collaborations other FBs are likely to engage with the research findings in more informal ways by reading publications or having *ad hoc* discussions with project members on specific issues.

Most PIs and project coordinators indicated that their projects are engaging with FBs through a project partnership (86%,18 of 21), and a small number are also engaging with FBs outside of the project consortium (19%, 4 of 21)[59].

Responses also suggest that projects are predominantly engaging with FBs to influence the use of novel or emerging processes and approaches in the production and/or distribution of food (68%, 13 of 19) and to influence new product development (58%, 11 of 19). To a lesser extent, projects are also trying to influence changes to business models (42%, 8 of 19) and company policies (37%, 7 of 19)[60] through partnerships and engagement with FBs.

2.3.4 TUKFS projects are generating knowledge by trialling new business models and developing new products in partnership with FBs

FBs are trialling new business models with the projects. One way in which the TUKFS programme is bringing about transformation is by providing FBs with opportunities to trial new business models. These are predominantly aimed at improving the efficiency and sustainability of food production. The case study evidence in Box 2.7 shows how two projects are trialling new business models.

Box 2.7 Examples on business model changes prompted by TUKFS projects

At least 5 of the 16 TUKFS projects have an element of product or business model innovation within them. For example, the UK Sustainable King Prawn Project is demonstrating the viability of growing prawns on terrestrial farms using recirculating aquaculture systems. The technique can promote conservation, as less land is needed to farm the prawns, without compromising revenue for farmers. The Raising the Pulse project is working with FBs partners to develop high fibre versions of white bread using a blend of fava bean and wheat flour, requiring the adaptation of business models from relevant FBs.

Source: Case study 3

Projects are working to develop or reformulate new products that are more sustainable, healthier and commercially viable. The projects that are active in this area are diverse in terms of the sectors and food types they cover, ranging from aquaculture and agriculture to food processing and catering.

A review of project documentation and interviews with PIs and project partners identified five projects with a primary objective relating to development of a new or reformulating an existing product and a further four projects relating to new products but not directly studying their development. A number of these projects target

[59] Two PIs/project coordinators for Synergy Fund projects indicated that their project is not engaging with FBOs.
[60] Three PIs/project coordinators (16%) noted other ways of engaging with FBOs, such as working with a company to evaluate the impact of its food products on the environment, creating new supply chains and networks, as well as sharing information and seeking advice from FBOs.

products in multi £bn markets, but distance to market entry varies across the TUKFS portfolio.

In developing a new product, academic research is feeding into the development process and shaping the route to market. TUKFS programme projects are therefore delivering outputs that go beyond traditional academic products, and that – much like Innovate UK projects – contribute to the acceleration of technology and can lead to new products. In some cases (e.g. the UK Sustainable King Prawn Project and Pasture to Plate), projects are investigating the viability of industries that are new to the UK (see case study 3).

The approach that projects are taking to the development of new products typically involves some (or all) of the following work streams. Firstly, consumer behaviour studies that aim to understand citizens' willingness to buy or consume a new product and lab studies that aim to determine the optimal production conditions and inputs. In parallel, modelling by social scientists aims to quantify trade offs and generate insights into the best places to produce the ingredients. Then, food technology studies in partnership with FBs support the prototyping of products and inform their scale up and further analysis. Box 2.8 illustrates this process in the context of the HiFi Bread project.

Box 2.8 Developing a new type of high fibre white bread

One of the objectives of the HiFi Bread project is to develop a new type of high fibre wheat and flour that can be used to make white bread with a higher fibre content, at no additional cost to consumers and with minimal disturbance to supply chains. The project involves several work packages, each looking at a part of the value chain and related processes. The project's work streams include consumer behaviour studies, food technology studies, trialling wheat lines and, ultimately, prototyping the bread and assessing interest from retailers. Researchers are also working to model the wheat supply chain. This process lends itself to a project with a food system lens and involves collaboration and engagement with actors across the whole value chain, including producers, processors, retailers and end consumers.

Source: Case study 3

Within the TUKFS programme, product development is more collaborative and interdisciplinary than under normal circumstances (outside the programme). The programme has also given FBs an opportunity to be involved at all stages of research by providing input to help formulate research questions.

Reflections on programme benefits collected through the project survey and interviews suggest that these types of product development partnerships are highly valued and may be an important legacy of the programme. For example:

> *We are talking with Sainsbury's and working with Waitrose and ASDA. They are engaging with the research and, although it is very small steps at the moment, I think it is really important for supermarkets to be aware of the work we are doing and thinking about how they could be involved and use the research/work to their benefit and the benefit of their customers.*

2.3.5 TUKFS projects are sharing knowledge on the benefits of novel and emerging processes for producing and distributing food that can be used beyond the TUKFS programme

Many of the research projects are working in partnership with FBs to generate the evidence needed to support and encourage the uptake of novel or

emerging processes. These are processes that have the potential to improve productivity and sustainability and make supply chains more resilient. Case study 4 demonstrates this in the context of sustainable farming practices, explaining how projects are actively working with farmers to study the benefits of, and barriers to, adopting regenerative agriculture approaches. The outputs resulting from these activities are expected to be available to FBs beyond the project, as explained by a partner to the H3 project:

> *In H3, we will provide one of the first datasets on the real impacts of a transition towards regenerative agriculture in English farms from two landscapes on food production, inputs and sustainability (including soil health, biodiversity and greenhouse gas emissions). There is a lot of interest in our data, and we expect our approach to understanding this transition from ecological, agronomic and social science perspectives to shape policy in all devolved UK governments in the future.*

Box 2.9 provides an example of how TUKFS projects are co creating content with FBs and sharing knowledge beyond their immediate partners.

Box 2.9 Examples of a project co creating content with farmers and sharing knowledge beyond the programme

H3 is working to document the benefits and barriers to adopting regenerative agriculture practices together with farmers. One of its partners is an organisation that advises farmers who are interested in adopting them on their farms. This is an example of instances where knowledge created under the programme is being shared (via the partner organisation) with farmers beyond the project.

Source: Case study 4

The TUKFS programme is making progress towards supporting food environments to become healthier and more sustainable, aiming to support better consumer food choices. Projects are working to improve the availability of nutritious and sustainably produced food options by working closely with FBs. This can be seen in project efforts to reformulate products with reduced unhealthy ingredients or promote local and seasonal foods. These efforts aim to provide consumers with a wider range of options that are better for their health and the planet, thereby proving concepts to drive a shift towards more responsible and sustainable eating habits. Box 2.10 shows the example from the Raising the Pulse project offering high fibre bread options to university students. However, it is important to note that despite tangible progress made towards these goals, the overall impact on the larger food environment in the UK remains relatively small at this stage.

Box 2.10 Example of a project introducing healthier and more sustainable food to university food procurement and their suppliers

The Raising the Pulse project produced 600 loaves of high fibre fava bean bread that were served to students in Reading University's halls of residence. The project also engaged with the university's head of catering, who increased the proportion of pulses in university menus and convinced a major supplier of raw ingredients to add a special type of chickpea to its offering. The learning from this project has been shared with an international network of universities through the Menus of Change initiative.

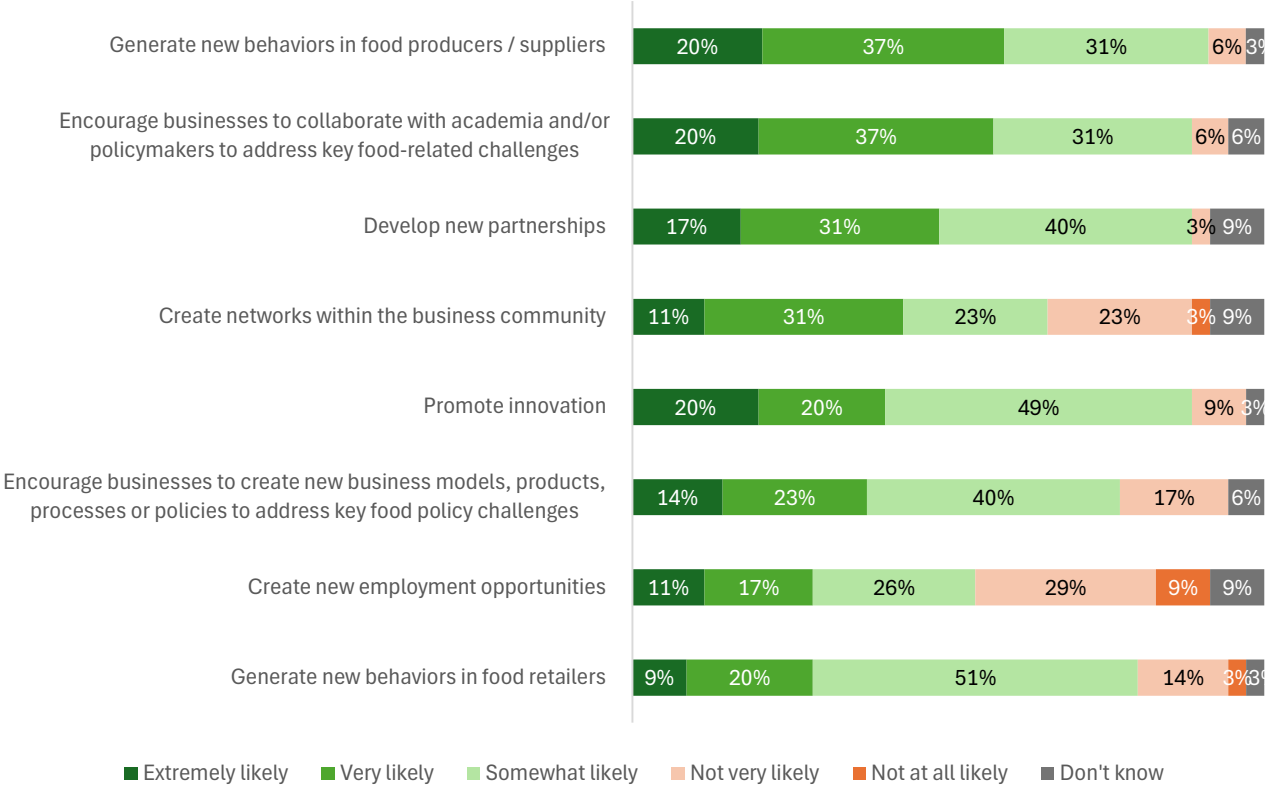
Source: Case study 3

Engaging with FBs as partners has been an effective way for projects to extend the knowledge they have generated beyond the programme as partners begin to share this knowledge through their own networks. It will be challenging, however, for the evaluation to measure precisely how much of this ongoing influence can be directly attributed to the programme.

2.3.6 The programme is exposing FBs to new ways of collaborating with researchers and policymakers, encouraging future collaborations to address challenges.

Over half of programme participants (63%, 35 of 56) expect their project(s) to impact business behaviour in the long term. Most felt that it was extremely or very likely that their projects would generate new behaviours in food producers and suppliers, encourage FBs to collaborate with academia and/or policymakers to address key food related challenges, and develop new partnerships. There were mixed perceptions of the extent to which projects would create networks within the business community, and less confidence that projects would promote innovation and create new employment opportunities (Figure 2.8).

Figure 2.8 In terms of the impact that you hope your project(s) will have on business behaviour, how likely do you think it is that your project will…



Source: ICF/Technopolis survey (N=35; PIs/project coordinators and academic partners who hoped their project would impact business behaviour in the long term)

A small number of business stakeholders responded to the survey (N=5). Three stated that their organisation had trialled a new initiative or service, one a new product, and two a change to the business model because of engaging with TUKFS programme projects. The same respondents said that participating in the projects had led to a change in attitude within the business in relation to willingness to

develop innovative new products (N=4), address food system issues (N=4), try new technologies (N=2), and challenge the status quo (N=2).

Changes in business behaviour that can be attributed to the programme will take time to materialise, and it is uncertain whether academic and FB partnerships will continue beyond the TUKFS programme's lifetime. FBs may be reluctant to adopt new models for reasons such as industry conservatism, or concerns about the cost of adopting new production or distribution methods. The new food products that projects are developing are not at a sufficient scale (at least in the short and medium term) to secure buy-in from large industry players and make a difference in the market. Many projects are ambitious (e.g. developing a new industry for the UK) and need to demonstrate the commercial viability of the products they are trying to introduce before scaling up production.

External factors beyond the projects' control may also influence the extent to which some of these new products or changes to business practices are taken up. These might include exogenous shocks that could, for example, increase inflation and reduce family food budgets, driving consumers towards cheaper and unhealthier food options. Ultimately, prices, marketing and consumer demand for new products will contribute to determining whether any of the products researched and developed through the programme will be commercially successful and help transform the UK food system.

2.4 The TUKFS programme is contributing to delivering more connected and evidence based policymaking, and new policy frameworks

The TUKFS programme has funded several projects that aim to contribute to evidence based policymaking that supports food systems transformation. Funded projects are doing this by generating knowledge that can inform policy or working with policymakers assisting them in developing new strategies and policies. Box 2.11 summarises the key findings and lessons learned.

Box 2.11 Key findings – Government policy

- Collaboration with local level policymakers can facilitate the introduction of food systems policies and strategies within the timeframe of a funded research programme. However, influencing national food systems policies and attributing changes in national policy to the activities of a research programme may be more challenging.
- TUKFS projects are supporting the development of new food systems policies, strategies and action plans at local and regional levels. The projects are also helping to implement food systems interventions at a local level through public procurement, for example through working with local Councils and informing their food procurement strategies. They are supporting cross sector alliances and leveraging these to support policy change.
- Impact at local level occurs through building relationships, trialling interventions and developing food systems policies. Impact at national level occurs through producing and disseminating evidence, influencing food policies, training practitioners and building relationships.
- The programme is producing and disseminating evidence to support policymaking and is sharing this knowledge through dissemination events and through participation in

policymaking processes. It is also producing knowledge on food systems policymaking processes.

- There is at least one instance where project activities led to a change in national policy (in expanding the provision of free school meals through auto enrolment).

2.4.1 Baseline

The baseline report[61] identified challenges of food policy context in the UK as well as difficulties in measuring the full extent of collaboration and knowledge exchange between researchers and policymakers prior to TUKFS. As of 2023, the UK policy landscape had a disconnected set of food policies and priorities.

As of 2023, there was a lack of a clear, overarching vision for food policy in the UK, and a proliferation of different government departments and agencies with an interest in food policy. The devolved and distributed nature of food policy in the UK means that the responsibility for policymaking is distributed across different government and public bodies within each of the four nations. As of 2023, each of the four nations had their own approach to food policy and strategy documents were in different stages of the policy cycle (e.g. England's National Food Strategy was published in July 2021, less than a year from when the first TUKFS projects started in Summer 2020. The Welsh National Food Strategy launched in 2014 expired in 2022).

There had been prior successful efforts to bridge the gap between researchers and policymakers (e.g. National Institute for Health and Care Research's Policy Research Programme Translating Obesity Research into Policy,[71] and the UK Cross Government Strategy for Food Research and Innovation,[72]). These examples highlighted that academia can play a role in supporting policy transformation.

2.4.2 TUKFS projects are engaging with policymakers at local, regional and national level

From interviews with PIs and project partners, we determined that at least 12 of the TUKFS projects are working with policymakers to support development of new or revised policy frameworks related to access to more affordable, attractive, healthy and sustainable diets. Most of the projects engage with policymakers at local (city council) or regional (regional council) levels, with the expectation that knowledge may be transferred to other areas or regions or scaled up to the national level. Projects are also supporting policymakers to develop partnerships and educating them in use of food systems approaches to policymaking. However, it is likely that any changes to policymaking approaches will not be measurable within the programme's lifetime. The intended long term impact is to stimulate evidence based policymaking that supports resilient and sustainable food systems, and an affordable healthy diet for all consumers, including lower income communities. In this context, TUKFS programme projects are:

- contributing to the development of new food systems policies at local and regional level;

[61] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

- helping to support food policy development at national level;
- building an evidence base for food systems interventions at local level;
- helping to build relationships and support cross sector alliances.

Collaborations within TUKFS projects involved 39 public sector organisations and 83 CSOs, resulting in engagement with policymakers and building cross sector alliances. More than half (55%, 31 of 56) of the academic partners reported in the survey that their confidence in collaborating with policymakers has increased because of participating in the TUKFS programme.

TUKFS projects have been engaging with policymakers since their inception, some projects having strong co creation element in the core of their objectives. Further engagement may occur beyond the timeframe of its funding. Research cocreation is a reoccurring theme across some TUKFS projects, including cocreation with policymakers. For example, FixOurFood co created some of their research objectives together with a citizen assembly and policymakers in North Yorkshire to ensure their project tackles relevant research questions for a wide range of stakeholders.

In addition, projects expect engagement with policymakers to increase once research findings are published and there is more evidence to share. For example, an academic partner from FoodSEqual explained that, '*we've got to get [a] certain way through the project… to work out where we can influence policy*'[62]. The projects will continue to continue to build and strengthen existing relationships with policymakers across the remaining period of the TUKFS programme. This will help projects share relevant findings and potentially influence policymakers. The TUKFS programme also has plans to encourage further collaboration with policymakers at programme level.

Projects are building cross sector alliances to facilitate the implementation of activities and supporting existing cross sector alliances for policy advocacy. More than half (53%, 9 of 17) of PIs and project coordinators who were engaged with policymakers reported that their projects are building cross sector alliances for food policy impact. Case study 5 demonstrates that projects have built new alliances to support interventions and activities. Projects involved in trialling menu changes in public procurement settings have built relationships with a range of stakeholders (Box 2.12).

TUKFS programme projects have supported existing cross sector alliances to impact local food policies. Several projects work with local food partnerships (Box 2.12) connecting community organisations, businesses, policymakers and researchers.

Box 2.12 Examples of cross sector alliances supported by TUKFS projects

Helping to create new alliances

- **BeanMeals** has worked with a large variety of school food stakeholders, including the FBs, catering staff and cooks, governors and head teachers, children and families, and policymakers and procurement teams. A policy stakeholder from Leicester City Council explained that involvement in BeanMeals has helped to support existing partnerships and has resulted in the formation of new partnerships, specifically with the FBs and farmers. BeanMeals has also been involved in co-hosting (with Beans Is How and the

[62] Interview.

AFN Network+) a summit on 'Beans as a Vehicle for Food Systems Transformation'. It brought together stakeholders from academia, policy and FBs, and discussed a range of topics, including how to identify and create appropriate evidence to support a shift in policy.

Providing support to existing alliances

- **FixOurFood**, **Mandala** and **H3** are working on a synergy project, alongside food partnerships from Bristol, Sheffield and Rotherham, to share good practice and assess the potential to scale up local initiatives. An academic partner from H3 sits on the steering group of SheFood, and other staff members contribute to working groups.
- **FoodSEqual** has worked with community researchers at the Brighton and Hove Food Partnership, sharing experience of academics with relevant methodological experience.

Source: Case study 6, ResearchFish, BeanMeals Resource[63], Synergy Project[64]

2.4.3 The funded projects are generating knowledge to inform policy

One of the programme's impact pathways is that projects produce evidence for, and share knowledge with, policymakers to inform policy. TUKFS programme projects are:

- building an evidence base for food systems interventions to promote and embed food systems thinking in policy;
- disseminating evidence to support parliamentary enquiries;
- sharing knowledge through participation in policymaking processes;
- producing knowledge on policymaking processes.

The TUKFS programme is producing and disseminating evidence at project and programme level. A majority (71%, 12 of 17) of PIs and project coordinators who engaged with policymakers reported that their projects were producing and disseminating evidence to support parliamentary inquiries. TUKFS programme projects[65] reported 85 policy influence activities in ResearchFish. Most of these are from two consortia projects (FixOurFood and H3), which reported 44 and 29 counts of policy influence, respectively. Most of the reported activities (72%, 61 of 85) had a national reach. A common type of policy influencing activity recorded in ResearchFish was contributions to national consultations or reviews (33%, 28 of 85; 4 of 4 reporting this activity[66]). Projects from Calls 1, 2 and 3 have submitted evidence at national level, and have collaborated to submit evidence on behalf of the TUKFS programme (Box 2.13). Case study 6 demonstrates that TUKFS programme projects are also producing and submitting evidence at local and regional level. For example, Mandala conducted an evaluation of school meal options for Birmingham City Council.

Box 2.13 Examples of evidence submitted to influence policy at national level

[63] Analysis of UK demand and value chain for plant-based foods, including beans (ox.ac.uk).
[64] Sharing good practice and learning through co-production with local food partnerships – University of Plymouth.
[65] Four projects reported on this output: H3, Mandala, FixOurFood and Fio-Food.
[66] Four projects reported on this output: H3, Mandala, FixOurFood and Fio-Food.

Call 1 – H3: Written evidence submitted to the Efra Committee Soil Health Inquiry highlighted the importance of maintaining soil stocks and soil health, provided advice on how to assess and monitor soil health, and called for specific targets and incentives to improve it.

Call 2 – Fio-Food: Oral evidence submitted to the Efra Committee on Fairness in the Food Supply Chain highlighted the importance of understanding the lived experience of people living with obesity and food insecurity.

Call 3 – Transition to Healthy Sustainable Diets (HSDs): Evidence submitted to the Net Zero Committee on how trade can help move towards net zero.

Programme level: Multiple TUKFS programme projects contributed to written evidence submitted to the Efra Committee Inquiry into Food Security.

Source: Case study 6 and ResearchFish

Knowledge and evidence have been generated through conducting project activities, interventions and experiments at local level. Case study 5 demonstrates that TUKFS programme interventions and experiments within public procurement settings have contributed to a large body of evidence that aids understanding of the food system, connections between procurement and distribution, and consumer perspectives. This knowledge may be disseminated within policy spheres that could have an impact on policies linked to public procurement. However, at this stage, there is limited evidence available with which to assess the potential impacts of these efforts.

TUKFS programme projects are sharing knowledge through participating in formal committees. A common type of policy influencing activity recorded in ResearchFish was participation in a guidance or advisory committee (33%, 28 of 85; 4 of 4 projects reporting this activity). Of these activities, 19 occurred at national level, with project partners acting as chairs, keynote speakers and expert witnesses; providing evidence and food systems expertise; and contributing to panel discussions. Projects worked alongside national charities such as WWFUK and WRAP as part of advisory boards. Projects were also involved in a diverse range of topics, including climate and nature, biodiversity, public food procurement, land use governance, food security, soil health, fairness within the supply chain, trade policy, urban horticulture, nutrition and obesity, affordable food, and healthy places. There were several examples of TUKFS project staff being seconded into local and national government (e.g. FixOurFood into Defra and H3 into Leeds City Council).

The TUKFS programme is also generating and sharing knowledge on how policy interactions take place. The programme is contributing to an improved understanding of food systems policymaking processes. One of the synergy projects is focused on leveraging knowledge policy interfaces – the processes, structures, and spaces where knowledge exchange occurs between relevant actors, including policymakers, FBs, researchers and CSOs. The resulting report explores how CSOs produce and use evidence, build and maintain relationships, and mobilise narratives to change food policy[67]. The report aims to support diverse approaches to achieving policy impact in practice and share lessons from CSO knowledge exchange and policy influencing practices that may help to inform academic researcher practices[68].

[67] Leveraging knowledge-policy interfaces for food systems transformation in the UK: Lessons from civil society (ukri.org)
[68] Leveraging knowledge-policy interfaces for food systems transformation in the UK: Lessons from civil society (ukri.org)

These lessons may help to inform academic researchers within the TUKFS programme as projects continue to work with policymakers and produce evidence for policy change. The annual meeting also provided a space for projects to share and discuss the best way for the TUKFS programme to impact policy. The knowledge generated through the programme may inform ongoing and future policy influencing practices. However, it is challenging to directly attribute and measure ways in which specific knowledge generation activities have informed changes in practice, as multiple factors influence how policy interactions take place.

Funded projects have helped to generate new ways of working and new partnerships. The projects have built relationships with policymakers at local, regional and national levels. Most PIs and project coordinators (88%,15 of 17) who engaged with policymakers reported that their projects were building and maintaining relationships with policymakers. The network analysis shows that 12 of the projects have formed relationships with policymakers, including all Call 1 project consortia.

The TUKFS programme network includes at least 39 public sector organisations, alongside at least 83 CSOs and 109 private sector organisations. Although there are comparatively fewer policymakers in the network, the organisations that are involved appear to be well embedded and active within it. The network analysis[69] shows that Defra is the highest ranked organisation across all centrality measures. The FSA is also highly ranked[70]. Public sector organisations have many partnerships (degree centrality), are pivotal to the network's connectivity (betweenness centrality) and are more influential within the network (eigenvector centrality). The high centrality of Defra and the FSA demonstrates the importance of developing relationships with national policy stakeholders. Evidence from Case Studies 5 and 6 shows that TUKFS programme projects have also partnered with policy stakeholders at local or regional level. For example, Mandala has maintained relationships with policymakers at Birmingham City Council, who continue to attend key meetings despite the council's financial problems.

There is emerging evidence that TUKFS projects are helping to promote and embed food systems thinking in policy contexts. Many of the projects have embedded systems thinking in their approaches. For example, FixOurFood guided North Yorkshire Council to use the Three Horizons approach[71] to support food systems change. A policymaker involved with Cultured Meat said that collaboration on the project had helped to provide a 'holistic view' of the direction of travel for policy. More than half (54%, 26 of 48) of PIs, project coordinators and academic partners thought it was very likely or extremely likely that the project would influence policymakers to think more systemically about food related challenges. The two policy stakeholders who responded to the survey (in their role as project partners), reported that they were more confident in using a food systems approach and working in interdisciplinary teams because of being a TUKFS project partner. They

[69] Network analysis is an interdisciplinary exercise that focuses on inter-relationships using statistical techniques, in which indicators of centrality are used to assign rankings to nodes on a graph corresponding to their network position. Three types of centralities are discussed in the network analysis: (1) degree centrality (the number of ties that a stakeholder organisation has); (2) betweenness centrality (the number of times a stakeholder organisation acts as a bridge along the shortest path between two other organisations), which measures the amount of network flow or information that a given organisation 'controls' (i.e. it can stop the flow of information if necessary); and (3) eigenvector centrality (a measure of a stakeholder organisation's influence in a network, with a high ranking meaning it has a high centrality).

[70] UKRI was not listed as a stakeholder in the network analysis.

[71] Three Horizons is a tool that helps support dialogue, planning and action to achieve transformation. For more detail, see: (PDF) Seeing in Multiple Horizons: Connecting Futures to Strategy (researchgate.net).

also reported that participation in the project had led to a change in their drive to address food systems issues. This is a small sample size but does indicate that the TUKFS programme has helped to promote food systems thinking among some policy stakeholders.

2.4.4 The TUKFS programme is informing food system policies, strategies, and action plans, and is contributing to wider food policy change

Projects are contributing to the development of new policies and initiatives using a food systems approach. TUKFS programme projects are involved in developing new policies using a food systems approach at local level. Many PIs and project coordinators have engaged with policymakers, either through a project partnership (57%,12 of 21), outside the project consortium (14%, 3 of 21), or through TUKFS programme knowledge exchange fellows (10%, 2 of 21). Most PIs and project coordinators (65%, 11 of 17) who engaged with policymakers reported that their projects supported policy design. Evaluation research included interviews with some policy stakeholders who confirmed value of these engagements and influence on policy.

Four projects have been identified as having contributed to the development of **seven food system policies, strategies and action plans at local and regional levels:**

- City level: Bradford, Leeds, Sheffield (FixOurFood), Birmingham (Mandala); Brighton and Hove (FoodSEqual); Leeds (H3)
- Regional level North Yorkshire Food Strategy (FixOurFood).

All four Call 1 projects have been involved in local level food system action plans (Box 2.14). 0 shows that nearly half (45%, 21 of 47) of PIs, project coordinators and academic partners thought it was very likely or extremely likely that their project would encourage the development of new policies and interventions using a food systems approach[72].

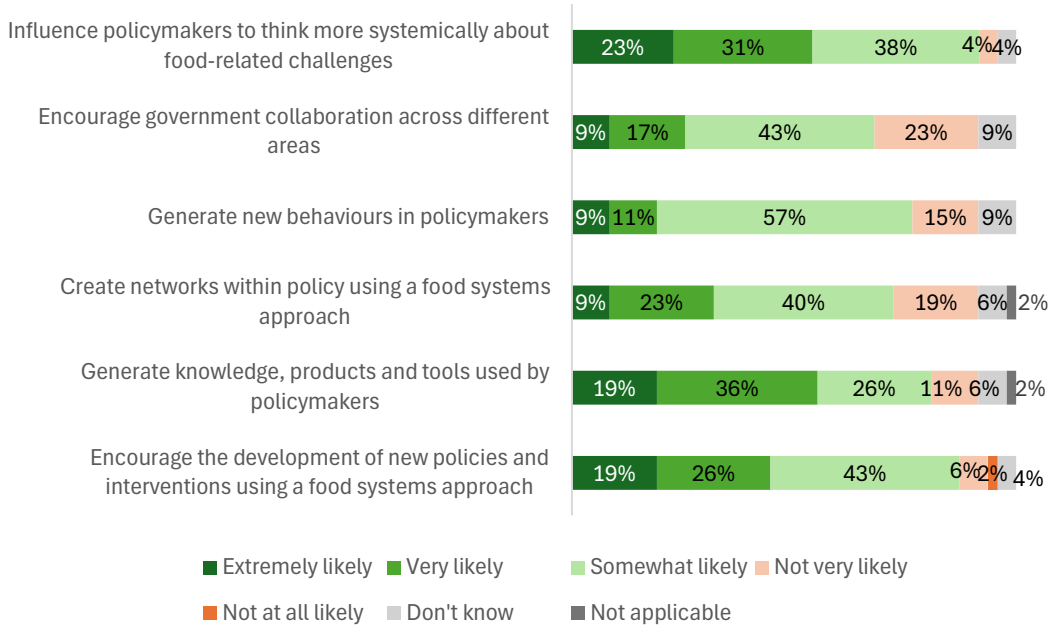
Box 2.14 Call 1 project involvement in local level action plans

- **FixOurFood** has worked at local and regional level, supporting the development of city level food action plans in Bradford, Leeds and Sheffield, as well as a North Yorkshire Food Strategy.
- **Mandala** supported the development of Birmingham City Council Food System Strategy.
- **FoodSEqual** is contributing to shaping the Brighton and Hove City Food Strategy.
- **H3** is contributing to the design of the Leeds City Council Food Strategy. A leading academic from H3 was seconded to Leeds City Council to help develop action plans for the food strategy.

Source: Case study 6

[72] A further 43% thought it was somewhat likely.

Figure 2.9 In terms of the impact that you hope your project will have on government policy (local/regional/national) or policy change, how likely do you think it is that your project will:



Source: ICF/Technopolis survey. PIs/project coordinators and academic partners who hoped their project would impact government policy. Base numbers vary (N=48 for influence policymakers to think more systemically about food related challenges; N=47 for all other statements).

Some projects have been involved in supporting the development of specific policies at national level, focusing on food related topics rather than the whole food system. Evidence from case study 6 shows that multiple projects are working at national level. For example, an academic partner from FixOurFood was seconded to Defra. Most non academic stakeholders (78%, 18 of 23) reported that they hope their project will have an impact on government policy in the long term. However, at this stage in the TUKFS programme, there is not enough evidence to confirm that it is supporting the development of food systems policies at national level.

Interventions in public procurement are levers for transformation and change. TUKFS projects are also testing interventions, conducting experiments and undertaking evaluations in various public procurement settings, including schools, hospitals and universities (Box 2.15). Interventions detailed in case study 5 demonstrate that there is an opportunity to promote healthy and sustainable diets through public procurement.

Box 2.15 Examples of projects testing public procurement interventions

- **BeanMeals** collaboration with schools has led to changes in menu design with the aim of incorporating more beans into school food across Leicestershire.
- **SNEAK** has encouraged menu swapping that removes particularly unhealthy options from the canteen at a University of Bristol halls of residence to improve nutrition.
- **Mandala** has worked with local children's hospitals in Birmingham to share ideas about how menus could incorporate more healthy, locally sourced and plant based options[73].

Source: Case study 5

[73] Case Study 5.

Some opportunistic activities within projects led to unanticipated impact on policy. Work by FixOurFood team into use of data linking approaches to identify children eligible for free school meals who were not receiving the support in Yorkshire provided evidence to a broader roll out of the policy that has led to 2,800 children across Yorkshire and London receiving free school meals.

2.5 Several projects are delivering activities that aim to transform local communities and create healthier, more sustainable food environments

The TUKFS programme has funded several projects that aim to transform local communities and create healthier and more sustainable food environments. Funded projects are doing this by enabling citizens and communities to take an active role in food systems transformation and engaging with the public to transform diets to be healthier and more sustainable. Box 2.16 summarises the key findings and lessons learned.

One of the programme's impact pathways involves communities and citizens taking an active part in creating healthier and more sustainable environments. TUKFS programme projects are engaging with citizens and working with CSOs and community researchers. 93% of PIs and project coordinators reported that their project engaged with citizens through primary data collection and 79% reported engagement through participatory research methods. Further, at least six projects are working closely with communities at local level.

Another programme impact pathway involves developing and translating new knowledge to help transform UK diets to be healthier, more sustainable and more accessible. Several projects are focusing on objectives linked to the National Food Strategy and public consumption patterns: escaping the junk food cycle (N=10); reducing dietary inequality (N=11); and shifting food culture (N=12)[74].

The extent and scale of impact on public awareness and consumption patterns varies across TUKFS programme funded activities and is difficult to measure. Nearly all projects view large scale impacts on consumer diets as a long term ambition, and not one that will be achieved in the lifespan of the programme or that will be directly attributable to it. The TUKFS programme addresses a variety of factors that impact consumer diets within the context of a larger collective effort involving multiple stakeholders and systemic changes.

Box 2.16 Key findings – Community/Citizen Behaviour

- Citizens are actively involved and empowered to be decision makers in local food systems transformation supported by TUKFS programme projects.
- Community involvement has been facilitated by strong CSO partnerships, participatory research methods and creative outputs.
- Citizen led activities are responsive to community needs and have a tangible impact on the local food system.
- Community researchers have benefited from increased skills and confidence and have improved their project's approaches to citizen engagement.

[74] Our Activities – Transforming UK Food Systems (ukri.org)

2.5.2 Baseline

The baseline report[75] found that, as of 2023, there was a complex interaction between individual behaviours, the actions and motivations of those in the food supply chain, and wider environmental factors. Evidence shows that food systems research can lead to benefits for citizens and communities through improved food environments, increased public awareness and improved knowledge of how to transform UK diets.

2.5.3 TUKFS projects are actively engaging with communities and citizens

The TUKFS programme is facilitating the active involvement of communities and citizens in food systems transformation research. Most PIs and project coordinators (93%, 13 of 14) responding to the survey reported that their project engaged with citizens through primary data collection, such as interviews, surveys and focus groups. Most (79%, 11 of 14) reported engagement with citizens through participatory research methods; some (36%, 5 of 14) through action research; and a few (21%, 3 of 14) through citizen led design. This demonstrates that most (85%, 11 of 13) of those engaging with citizens choose methods that involve direct collaboration. Case study 8 demonstrates that TUKFS programme projects collaborate with a range of food systems stakeholders and often include citizens with different perspectives on the food system or a specific food area.

Partnerships with CSOs are facilitating the involvement of citizens and communities in project activities and local food systems transformation. Most PIs and project coordinators engaged with CSOs and non-governmental organisations, either through project partnership (76%, 16 of 21) or outside the project consortium (29%, 6 of 21). Case study 8 demonstrates that CSOs have facilitated citizen engagement by contributing to the implementation of interventions and activities, as well as facilitating work with community researchers.

2.5.4 Communities and citizens are actively involved in and generating knowledge on local food systems transformation

TUKFS projects have introduced interventions or conducted activities that improve access to and awareness of healthy and sustainable foods. Some interventions focus on improving access to healthy and sustainable foods, such as fresh fruits, vegetables and pulses**.** Case study 7 demonstrates that these interventions have reduced economic barriers, changed the food environment, altered menus, and improved products to promote healthy and sustainable diets. Generally, projects have worked with a specific intervention group, such as residents at a university hall of residence, people that use foodbanks, or people living on selected streets in a local area. TUKFS projects are also conducting a range of activities to improve awareness of healthy and sustainable diets. Case study 7 exemplifies how projects are aiming to improve awareness of healthy and sustainable diets through educational activities, information sharing, information labels and creative forms of engagement. Projects often seek to improve awareness and access when piloting an intervention or activity.

[75] ICF and Technopolis 2023. *Evaluation of the Transforming UK Food Systems Programme. Process Evaluation and Baseline Report*. Not published.

Citizen perspectives are being included in the design of products, interventions and communication strategies. As shown in Box 2.17 (based on evidence from case study 7), TUKFS projects have made efforts to understand and include the perspectives of citizens when designing interventions, strategies and products to promote healthy and sustainable dietary change with business stakeholders. The involvement of citizens in research helps to generate knowledge on citizen behaviours and perspectives[76], which can inform targeted dissemination activities, behaviour change strategies and product development. This may improve the likelihood that these interventions, strategies and products contribute to citizen behaviour change.

Box 2.17 Examples of how projects have included citizen perspectives in the design of products, interventions and communication strategies

- **Products – Raising the Pulse** has conducted focus groups to understand citizen's motivations and food preferences, which have influenced the development of a new pulse based product.
- **Interventions – SusHealth** conducted a survey to understand citizen perspectives on the SusHealth label, which have helped to inform the design of the combined nutritional and environmental score label. This design was then used in the SusHealth Living Lab experiments.
- **Interventions and communication strategies – Fio-Food** has collected insights from citizens through patient and public involvement workshops on supermarket interventions and communication strategies. This feedback has been provided to Sainsbury's to inform future strategies aimed at increasing sustainable and healthy food purchasing.

Source: Case study 7

Citizens are engaging as decision makers within research design and impact project implementation, which helps ensure project activities are aligned with community needs at a local level. Involving citizens in decision making processes can impact directly those who participate. As explained in case study 8, the SEFS project (Social Enterprise as a Catalyst for Sustainable and Healthy Local Food Systems) partners with six different social enterprises and facilitates the co production of small scale, action oriented, local projects tailored to contextual needs and community ideas. Further, case study 8 shows that those individuals involved in local food systems transformation felt proud and valued participating in the activities.

Inclusive decision making can generate citizen empowerment and facilitate future citizen engagement in food system transformation. However, the impact of these research projects will depend on the continuation of the community activities beyond the lifetime of the TUKFS programme. Case study 8 indicates that BeanMeals and SEFS (projects that ended in 2024) had plans to continue to use some of their co designed games and engagement tools after their projects finished.

TUKFS projects are working with community researchers when conducting research and introducing impact projects. Community researchers are typically community members that have limited prior experience of research and share at least one 'lived experience' with a project's research participants[77]. Working with a community researchers is an approach used within Participatory Action Research, an approach that seeks to actively involve communities in generating knowledge

[76] Participatory Methods in Food Behaviour Research: A Framework Showing Advantages and Disadvantages of Various Methods

[77] https://doi.org/10.1332/policypress/9781447348016.003.0003

and recognises the importance of citizen knowledge and perspectives[78]. Some PIs and project coordinators (43%, 6 of 14) responding to the survey reported that their project worked with community researchers. The role of community researchers varies; they have been involved in a wide variety of research and project implementation activities, including running workshops, hosting events, reaching out to the community and producing creative outputs.

2.5.5 Knowledge is being generated and disseminated through communities and about community focused food systems transformation research.

Knowledge is being generated and disseminated through community researchers to broaden reach and impact across local communities and networks. As shown in case study 8, community researchers have generated new knowledge on food systems and explored new perspectives because of engaging with the TUKFS programme. Community researchers may be knowledge brokers within their communities during programme implementation, and citizens involved in the research can leverage existing community networks to disseminate knowledge. Community researchers may continue to build upon and disseminate knowledge in future food related projects after the programme ends.

Knowledge is also disseminated through creative outputs. Six projects recorded specific creative outputs through ResearchFish. These include films, videos and animations (N=10); artwork (N=2); images (N=2); artistic or creative exhibitions (N=1); artefacts, including digital (N=1); and creative writing (N=1). The projects also experimented with different outputs. For example, FixOurFood produced an augmented reality tour, creative poems and a game. The outputs enabled projects to engage with the public at conferences and online, 'generated interest and increased knowledge'[79], and allowed 'people from all backgrounds to easily understand the project's rationale and ambitions'[80]. For example, one animation and two infographics were shared by FioFood on X and together had approximately 20,000 views.[81] These dissemination activities may contribute to knowledge generation within the community but evidence to demonstrate this is not yet available.

TUKFS programme projects are conducting public engagement and dissemination activities. Most PIs, project coordinators and academic partners surveyed (70%, 39 of 56) plan to communicate findings through engagement with communities and citizens. Project engagement activities also target public audiences and may lead to a change in behaviour. Of those activities, 10% (61 of 586) were reported[82] to have led to a change in views, opinions or behaviours among the audience. A further 23% (133 of 586) were reported to have led to an increase in requests about participation or involvement, and 15% (89 of 586) to an

[78] Participatory_methods_presentation-compressed.pdf

[79] ResearchFish – Creative products – Transformations to regenerative food systems – Interactive virtual tour of Grow It York vertical farm.

[80] ResearchFish – Creative products – Transformational blueprint for a blue economy on UK terrestrial farms: integrating sustainable prawn production in a changing agricultural landscape – Infographic of the UK Sustainable King Prawn Project.

[81] ResearchFish – Creative products

[82] This only includes engagement activities that were recorded in ResearchFish with a corresponding outcome (586 of 715 engagement activities). This is based on activities where the most significant outcome listed is 'Audience reported change in views, opinions or behaviours. It is not clear how this outcome was measured by the researchers.

increase in requests for further information. ResearchFish data show that 18% (131 of 715) of engagement activities target 'public/other audiences', and a further 16% (113 of 715) were recorded as 'media (as a channel to the public)'.

These engagement activities reached large audiences: 68% (160 of 234) of the activities that targeted 'public/other audiences' or 'media (as a channel to the public)' had audiences of more than 500 people. These activities included press releases or press conferences (51%, 125 of 244); broadcasts on TV, radio or podcasts (15%, 37 of 244); and talks or presentations (14%, 33 of 224). Projects have also engaged the public through social media. An analysis of X posts undertaken for the evaluation shows that there were 1,928 posts about the TUKFS programme, with a potential combined reach of just over 13 million[83]. In the context of broader online discussions about food systems in the UK, approximately 6% of posts related to the TUKFS programme, demonstrating a small contribution to the online discourse. Some of these tweets encouraged healthy eating habits, while others shared project activities.

Knowledge is being generated on co production approaches, working with community researchers and designing food systems interventions. TUKFS programme projects are developing checklists, sharable guides and recommendations on how to approach and conduct research projects involving co production. For example, the co-production synergy project developed a checklist on co production best practices, which provides a set of questions to consider when planning and conducting co-produced research[84]. The synergy project also produced a 'messy map' illustrating the barriers and solutions associated with relationships, knowledge, power and inclusivity when working with co production approaches[85]. These resources bring together knowledge and considerations from six projects and showcase programme level coordination, collaboration and knowledge generation.

TUKFS programme projects have also demonstrated the value of working with community researchers and highlighted lessons that may help inform future work with community researchers. As explored in case study 8, the projects highlighted the importance of flexibility, openness and responsiveness when working with community researchers. An academic partner on SEFS explained how the approach and level of involvement was adjusted to the needs of the social enterprise and to each individual community researcher, as some 'found it more challenging than others'. The projects also highlighted the importance of demystifying research[86]. An academic partner on SEFS explained that they tried to overcome the challenge of community researchers not identifying as researchers by finding different titles, such as 'community engagers', that people felt more comfortable with.

The projects have highlighted the importance of mutually beneficial partnerships with CSOs. A researcher from H3 said 'there's got to be a bit of give and take, whether that's the time or whether it's access to facilities or kind of just to show we're not just there […] to measure and go' (Researcher, H3)[87]. The findings from

[83] Analysis of X posts using a set of predefined words to collect posts on X across 19 months from November 2021 to March 2024.
[84] Synergy_Illustrated_Checklist.pdf (plymouth.ac.uk)
[85] Synergy_Messy_Map.pdf (plymouth.ac.uk)
[86] Exploring social enterprises' engagement in transdisciplinary research: a reflective analysis | By K Graham, K Burningham and A Loukianov (cusp.ac.uk)
[87] Healthy soil, healthy food, healthy people (H3): Developing partnerships with community organisations – University of Plymouth

case study 8 echo this. For example, SEFS adjusted Work Package 3 to reflect the needs of the social enterprises who wanted to 'deliver on impact' (academic partner interview) rather than create evaluation or impact tools as initially planned.

The programme is also generating knowledge on the value of creative forms of public engagement. As explored in case study 8, FoodSEqual published a leaflet outlining the potential benefits of visual engagement approaches. Visual engagement activities can help to improve access to information for those with lower literacy rates, hearing loss and language barriers[88].

The projects are also generating knowledge through conducting pilot interventions and activities, which is being shared across the TUKFS programme network and more widely. TUKFS projects are collecting data to assess the impact of pilot interventions and better understand how to effectively introduce food system transformation interventions. For example, FoodSEqual is collecting biomarker data to assess the efficacy of the FreshStreet intervention. This knowledge is being shared through synergy projects and annual meetings, and across the formal and informal networks developed alongside the TUKFS programme. This shared knowledge may help to inform future action on food systems transformation and therefore have an ongoing impact.

2.5.6 The citizen focused approach benefits the individuals and organisations involved, the project activities and the local food system

There are early indicators that TUKFS interventions can help to improve access to and awareness of healthy and sustainable food within the specific intervention groups. At this interim stage, it is too early to determine the impacts of these interventions. However, there have been some early qualitative indications of impact arising from some interventions. Case study 7 shows how the FreshStreet intervention run by FoodSEqual has enabled citizens to experiment with and enjoy new healthy foods, changed purchasing practices, improved citizen wellbeing, and boosted community connectivity. Some interventions have been successful in altering behaviour based on improved awareness within the test group. The students involved in the intervention chose healthier and more sustainable menu options when the SusHealth index was shown on menus (case study 7). However, at programme level, there is not currently enough evidence to demonstrate that the TUKFS programme has led to changes in diet related behaviours due to improved awareness.

TUKFS projects have included and amplified the voices of citizens among other food system stakeholder groups. Citizens have been working alongside FBs and other businesses to inform strategies, products and interventions. As demonstrated in case study 7, projects have provided a platform for food system stakeholders, including businesses and policymakers, to work closely with citizens on food systems transformation. For example, Sainsbury's (the FBs partner for Fio-Food) highlighted the value of working with individuals with lived experience, while explaining that this was a new opportunity for the business. All seven business and policy stakeholders taking part in the survey indicated that they were more

[88] Exploring what visual approaches bring to public engagement (fliphtml5.com)

confident engaging with citizens on food systems issues[89]. This may contribute to the further inclusion of citizen perspectives in future projects.

The community researchers benefit from involvement with the TUKFS projects. As shown in case study 8, community researchers involved in TUKFS projects reported improved their confidence and mental health, developed skills, and fostered new relationships and connections. The short term impacts of involving community researchers are linked to the direct benefits that it has for them. The potential long term impact of the skills and confidence gained by community researchers is unknown at this stage and will be difficult to assess. Community researchers may be involved in future food related projects or work, where they can provide value based on the confidence and skills, they developed through involvement in the TUKFS programme. This could include sharing practices linked to food systems thinking and co production approaches that could help to inform future food systems work.

The involvement of community researchers helps to support community engagement. Community researchers, who are often trusted within the local community, have helped to build trust and facilitate broader community engagement activities[90]. As demonstrated in Box 2.18 (case study 8), community researchers have helped to co-produce creative outputs that help to engage the local community on food systems issues. The involvement of community researchers in turn supports citizen involvement and is linked to the implementation of project activities that suit local communities and contribute to local food systems transformation.

Box 2.18 Example of the benefits of working with community researchers

FoodSEqual has worked closely with community researchers across four different locations. These community researchers have helped to make community members feel 'more relaxed and welcome' (academic partner interview), as well as helping to facilitate community workshops and produce creative outputs, such as arts and crafts resources. Community researchers have demonstrated the value of these creative approaches, which can help make research 'more fun' (academic partner interview).

Source: Case study 8

There is emerging evidence that the co design of impact projects has delivered positive outcomes at a local level, however further evidence is needed. Citizen led projects can have a tangible outcome, as shown in case study 8. It is difficult to assess the impact on citizens and local food systems at programme level, as projects are at different stages (Box 2.19). Some interventions that are working to have a positive impact on the local food system are still ongoing, and projects are still collecting data on their efficacy. These data will help to inform the final TUKFS programme evaluation but are not available at the interim stage. Other activities that are intended to have a positive impact on the local food system are not yet implemented. The potential impacts of ongoing and planned activities are not known at this stage but may contribute to the overall impact of the programme on citizens and the local food system. Evidence related to ongoing and planned activities will likely be available to inform the final programme evaluation.

[89] Business stakeholders: 40% much more confident (2 of 5); 60% slightly more confident (3 of 5). Policy stakeholders: 100% slightly more confident (2 of 2).
[90] As shown in case study 8

Box 2.19 Examples of impacts on local food systems

Completed activity – One of the **SEFS** impact projects at Social Adventures was focused on introducing winter cultivation for a food growing project. The project helped to ensure that the social enterprise could operate through the year, diversify the produce grown, and improve service user attendance and consistency.

Ongoing activity – The **FoodSEqual** project is running FreshStreet interventions that provide local residents with vouchers for fresh fruit and vegetables. The project is collecting biomarker data that will provide indications of improvements in citizen health. There have been early qualitative and anecdotal indications that the project is having a positive impact, as discussed in case study 7. However, the biomarker data is not available yet.

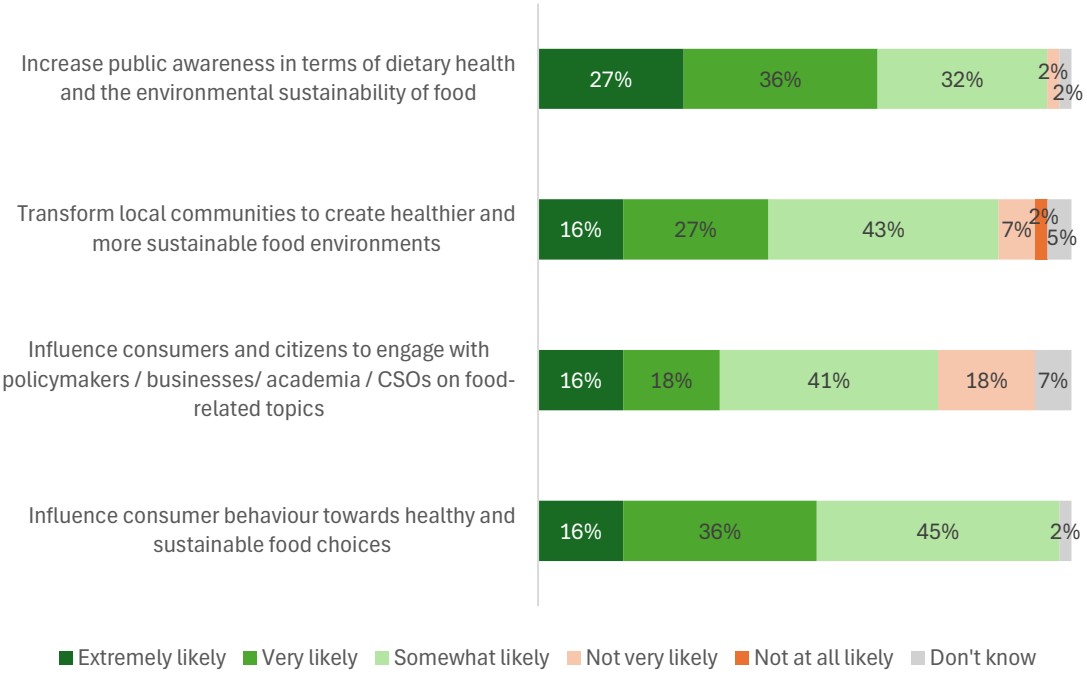
Planned activity – The Plymouth Fish Finger project, led by **FoodSEqual**, has produced a prototype of a sustainable, locally sourced fish finger and aims to introduce it into the local school meal system. However, the potential impact of the fish finger on the local food system is unknown. At this stage, the measurable impacts are associated with the process of co-producing the fish finger, as explored in case study 8.

Source: Case study 8

The knowledge produced about how to conduct local food systems transformation research may help to amplify the impact of the TUKFS programme in the future. One PI explained that although impact at a local level is important, the project is aiming to develop knowledge of how to research food system transformations which could be applied in different contexts or at different scales. In isolation these local level projects may not lead to significant system wide change, but the impact could be amplified if the knowledge is applied elsewhere.

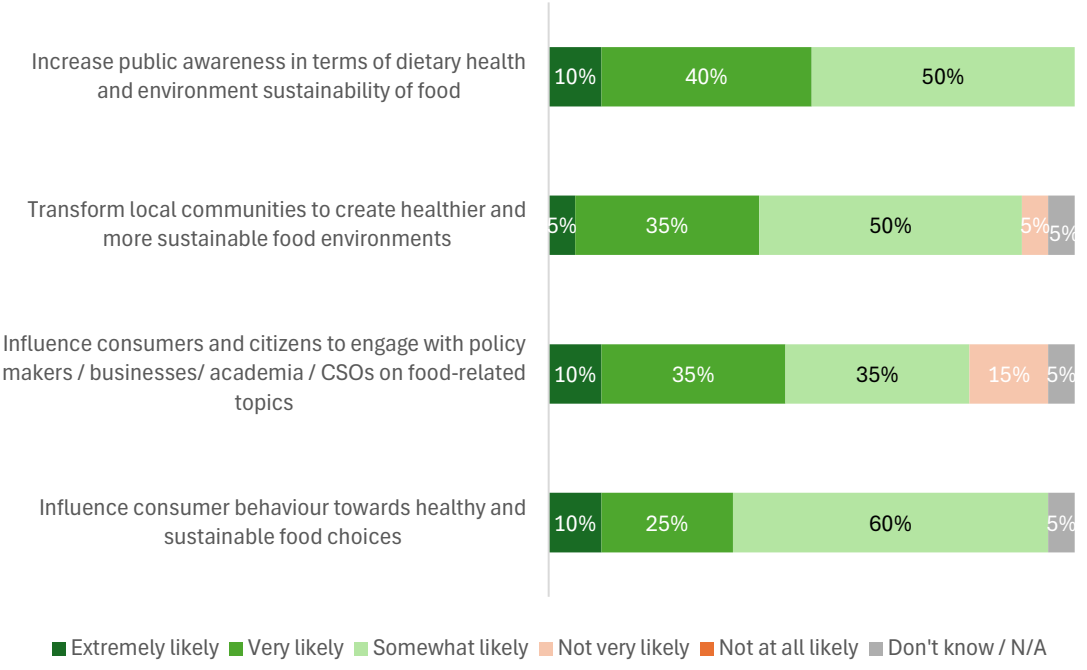
TUKFS project partners hope that projects will improve public awareness of, and influence consumer behaviour related to healthy and sustainable diets. In the survey, 79% (44 of 56) of PIs, project coordinators and academic partners and 87% (20 of 23) of non academic partners reported that they hoped the project would have an impact on citizen or consumer behaviour in the long term. Figure 2.10 shows that most academic stakeholders believed it was likely (somewhat likely, very likely or extremely likely) that the project would increase public awareness in terms of dietary health and the environmental sustainability of food, and influence consumer behaviour towards healthy and sustainable food choices. The non academic perspectives showed a similar pattern (Figure 2.11).

Figure 2.10 Academic partners: In terms of the impact that you hope your project will have on citizens' behaviour, how likely do you think it is that your project will:



Source: ICF/Technopolis survey (N=44; PIs/project coordinators and academic partners who hoped that their project would impact citizens' behaviour)

Figure 2.11 Non academic partners: In terms of the impact that you hope your project will have on citizens' behaviour, how likely do you think it is that your project will:



Source: ICF/Technopolis survey (N=20; non academic stakeholders who hoped their project would impact citizen's behaviour)

3 Conclusions

This chapter provides the conclusions of this report. It reflects on the ongoing development of the programme, examining progress against its ToC and the extent to which the programme is on track to meet its objectives.

The programme's vision is to achieve a transformation of the UK food system by 2030 through interdisciplinary research and training, focusing on promoting health and creating a healthy natural environment. This will support the UK government in meeting its targets of reducing childhood obesity by 50% and greenhouse gas emissions by 57%.

This interim report provides evidence of progress on activities and outputs in line with the ToC for TUKFS, and early signs of progress towards TUKFS expected outcomes. The programme is currently on track to achieving its objectives and contributing as expected towards the four main impact pathways outlined in the Theory of Change.

Evidence shows that the main assumption of the programme holds true. TUKFS is generating food systems transformation knowledge through MIDRI and collaborative partnerships across the food sector. It is also increasing food systems transformations skills across these stakeholders. The new knowledge and skills are, so far, relevant and being adopted by the TUKFS network of stakeholders, leading to some changes in their practices and behaviours.

The expectation is that TUKFS outputs will influence food system stakeholders beyond TUKFS, contributing to broader food systems transformations. While long term results will only be seen a decade or more into the future, TUKFS is laying the groundwork for transformational change in the UK food system. TUKFS plans to synthesise and disseminate the programme's evidence during the last phase will be crucial in determining whether it can accomplish its full potential impact.

Table 3.1 provides a summary of status against each of the TUKFS programme's objectives using the red, amber, green (RAG) rating system as of August 2024.

Table 3.1 Summary of the progress made towards the programme's objectives

Programme's objective	RAG rating	Commentary
1. Transform UK diets to be healthier and more sustainable, as well as desirable and accessible, for all groups in society (life stage, gender, ethnicity, income, region and neighbourhood); and determine how UK food production, manufacturing, retailing and imports can address current barriers to delivering these diets in a sustainable way.	**Amber**	■ Any evidence of impact on this objective will emerge after the TUKFS programme is complete. ■ There is evidence of contribution to dietary transformation in the research areas that the projects and CDT students are focusing on.
2. Change the behaviour of actors across the food system, from production to consumption, including using big data approaches to understand food choices (e.g. loyalty card data) and drivers; and	**Amber**	■ TUKFS is generating food systems evidence, producing outputs and expanding knowledge on food systems. ■ TUKFS projects aim to influence the behaviour of the diverse

Programme's objective	RAG rating	Commentary
transform food environments so that the healthy and sustainable choice is desirable and accessible across all groups and communities.		partners they are working with towards data driven decisions to transform food environments into healthy and sustainable ones.
3. Model interdependencies across the UK food system to join up healthy and accessible consumption with sustainable food production; and link datasets to improve decision making, identify win-wins, manage trade offs and avoid unintended consequences, with the long term aim of developing a digital twin of the food system.	**Green**	■ The research projects' focus areas cover almost all areas of the food system in the UK and join up production and consumption. ■ 10 projects are focusing on modelling interdependencies and generating datasets. Some of this knowledge is expected to be published during the life of TUKFS.
4. Co-produce research between academia and stakeholders (UK government, business and civil society) to ensure that new knowledge drives multi pronged and simultaneous action across the food system.	**Green**	■ Strong examples of co production happening with FBs, government, CSOs and communities. ■ All the projects align with government priorities and engage regularly with government ■ There is less evidence of uptake, but this is expected. Wider systems change is mainly expected beyond the life of TUKFS.
5. Developing a pipeline of skilled people who apply critical, interdisciplinary systems thinking to the food system to strengthen UK capacity and capability, and drive the change required in academia, industry and government.	**Green**	■ TUKFS is supporting a pipeline of 56 PhDs via the CDT and 100 ECRs. There is anecdotal evidence of ECRs receiving additional grants or moving on to other roles. ■ There is evidence of the uptake of food systems knowledge across TUKFS programme participants, and of the knowledge being disseminated widely beyond programme activities.

The summary below highlights evidence for each impact pathway.

TUKFS is contributing to generating food systems knowledge and to increasing skills and capacity for food systems research.

- TUKFS is generating co-produced knowledge at the forefront of food systems research (e.g. testing interventions to gather data to ground approaches in evidence, developing new metrics and models to measure environmental, health or other outcomes, or gathering evidence to help understand the food system).

- The programme funded 16 research projects and established a CDT with 56 students across 3 cohorts. These initiatives all have MIDRI and are contributing to increasing the supply of interdisciplinary food systems thinkers. Anecdotal evidence presented indicates these outputs are high quality.
- The projects have produced 1,100 outputs thus far (with 92 publications reported and 715 engagements). The outputs include publications, policy briefs and creative products. These are diverse in character and are targeted to a variety of audiences. There are some preliminary examples of uptake. However, it is expected that uptake will continue beyond the life of TUKFS.
- A food systems community is emerging because of the programme. The TUKFS programme has a network of over 300 partners across academia, government, business and civil society. This network promotes a food systems approach and ensures the relevance and applicability of research findings. There are no plans for supporting this network beyond the life of TUKFS.
- The TUKFS programme management team has ensured that food systems research is championed across UKRI and that synergies are built where relevant.

TUKFS has contributed to business partners taking up food systems approaches, leading to trialling new ways of working (e.g. new products)

- Cross sector alliances and partnerships have helped to implement interventions and activities to enable transformations of the food system.
- There are at least nine projects where projects are partnering with FBs to develop or reformulate healthier and more sustainable food products and gather data to provide reliable and comparable information to consumers.
- FBs are being exposed to new ways of collaborating with researchers and policymakers as part of the funded projects and CDT placements. Working across the value chain exposes FBs to new ways of working with each other. Experience from the funded projects and CDT placements may also encourage FBs to collaborate with academics or policymakers to address future challenges.
- The programme is observing examples of change with small FBs happening at a faster pace than with national food systems policies or large businesses.

There is evidence of increasingly connected and evidence based policymaking, and the design of new food policy frameworks as result of TUKFS activities.

- The programme is informing local and regional food policies and public procurement interventions. Some projects, such as FixOurFood and Mandala, have supported city level food action plans and strategies.
- The programme is producing and disseminating evidence to support policymaking and sharing this knowledge through participation in policymaking processes. It is also producing knowledge of food systems policymaking processes.
- The programme is observing examples of change with local level policymakers happening at a faster pace than with national food systems policies or large businesses. There is at least one instance where project activities led to a change in national policy (in provision of free school meals).

Projects are delivering activities to help transform local communities and create healthier, more sustainable food environments

- Strong civil society partnerships and methods that involve community researchers can help research projects build trust with communities and citizens. Creative outputs can facilitate community engagement.

The programme is currently progressing as planned and contributing towards achieving its objectives. All individual activities are expected to deliver their committed outcomes. Significant progress has been observed in the policy area, while there has been slower progress in generating high quality research, such as the number of academic outputs. The TUKFS programme has successfully fostered an enthusiastic and passionate community around food systems research in the UK. However, the long term sustainability of the TUKFS programme impacts, as well as the dissemination of outputs post programme, remain uncertain. Further, since the TUKFS programme is still ongoing; it is premature to fully assess its social and economic impacts.