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Transformations to regenerative food systems—An outline of the FixOurFood project

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Abstract

This paper provides an outline of a new interdisciplinary project called *FixOurFood*, funded through UKRI's 'Transforming UK food systems' programme. *FixOurFood* aims to transform the Yorkshire food system to a regenerative food system and will work to answer two main questions: (1) What do regenerative food systems look like? (2) How can transformations be enabled so that we can achieve a regenerative food system? To answer these questions, *FixOurFood* will work with diverse stakeholders to change the Yorkshire food system and use the learning to inform change efforts in other parts of the UK and beyond. Our work will focus on shifting trajectories towards regenerative dynamics in three inter-related systems of: healthy eating for young children, hybrid food economies and regenerative farming. We do this by a set of action-orientated interventions in schools and the food economy, metrics, policies and deliverables that can be applied in Yorkshire and across the UK. This article introduces the *FixOurFood* project and concludes by assessing the potential impact of these interventions and the importance we attach to working with stakeholders in government, business, third sector and civil society.

KEYWORDS
dietary change, food systems, hybrid organisations, regenerative, regenerative farming, transformation

INTRODUCTION

There is an urgent need to transform the UK's food system by placing healthy people and a healthy environment at its core (Bhunnoo & Poppy, 2020). In the UK, poor diets high in high fat, sugar and salt foods result in 1 in 7 deaths every year, costing the economy £27 billion a year (Public Health England, 2017). Furthermore, almost 23% of children are already overweight or obese when they start primary school (NHS Digital, 2019). Dietary intake in children consistently fails to meet recommendations (PHE, 2019), with many consuming above recommended levels of free sugars and saturated fat and inadequate amounts of fibre, vitamin D, fruits and vegetables. Schools and early years' settings play a key role in implementing change in the food system (Finegood et al., 2010), and children are powerful drivers of change. Around 30% of foods/drinks consumed by children are during the school day (Rogers et al., 2007) and our focus on these settings aims to reduce inequalities in diet quality and related health early in life and catalyse dietary change more broadly.

Poor dietary health is compounded by increasing UK's food poverty. Between April 2018 and March 2019, the Trussell Trust's network of food banks distributed 1.6 million food parcels, a 26-fold increase on 2010 (Power et al., 2020; Trussell Trust, 2019). The COVID-19 pandemic has further exposed the rise of food poverty in the UK. A YouGov survey commissioned in partnership with the Food, Farming and Countryside Commission showed 1.5 million reporting that they had gone a whole day without eating since the first lockdown came into effect, and 7.1 million say they have had to reduce or skip meals (Food, Farming and Countryside Commission, 2020). *FixOurFood* is working with a range of schools across Yorkshire, including those in areas of disadvantage, and we will work on reducing inequalities in diet quality and are also evaluating the impacts of initiatives such as the Holiday Activities and Food Programme on food security.

At the same time, food production that supplies UK diets is unsustainable. Greenhouse gas (GHG) emissions from UK agriculture are estimated to cost the UK £3.1 billion per year (Defra, 2018). Agriculture is responsible for 10% of UK's GHG emissions (judged by CO_2e) as well as over half the UK's methane emissions and three-quarters of its N_2O, both much more potent GHG than CO_2. Meeting the UK's commitment to Net Zero by 2050 will require a rapid shift to low-carbon practices in farming (Lynch et al., 2020) and the wider food system. Furthermore, one-third of UK soils are assessed as degraded with 3 million tonnes of topsoil eroded each year, with such losses estimated to be 100 times more rapid than rates of formation (Banwart et al., 2015). Intensive agricultural practices are also associated with a loss of 60% of soil carbon (organic matter), a critical indicator of soil function. Our focus will be to work with a group of farmers who are committed to various forms of regenerative agriculture to test and trial approaches to build soil health, promote biodiversity and carbon sequestration.

The UK food system is shaped by policies developed and decisions taken by a wide range of government departments at the national, regional and local levels. One analysis found that at least 16 government departments and agencies are involved in developing and implementing policies that impact food systems at the national level (Parsons, 2020). Such a diffuse policy-making environment means that achieving food policy coherence represents a significant challenge. Without a more integrated approach to food systems policy and governance, policy made to improve one food system outcome, such as healthy eating in schools, can unbalance or even undermine policy made elsewhere, such as reducing CO_2 emissions from agriculture.

Veldhuizen et al. (2020) introduced the 'Missing Middle' concept to signify the lack of coordinated action from food production to consumption (i.e. the actors, activities and outcomes involved in processing, procurement, manufacture, catering, retail and consumption). There are calls to develop new approaches and business models focused on environmental sustainability, equality and healthy nutrition. Doherty et al. (2014) define these new models as hybrids (i.e. novel institutional forms [business models, alliances, networks]) that challenge traditional conceptions of economic organising, and effectively balance pursuit of financial, social and environmental goals. However, there has been limited research to identify how they work and how they can be scaled-up and promoted to effect transformative change in the food system.

FixOurFood addresses these issues of human and planetary health through an interdisciplinary change initiative, designed to transform the Yorkshire food system to a regenerative food system, focusing on three inter-related systems of: healthy eating for young children, hybrid food economies and regenerative farming. Funded by UKRI's Strategic Priorities Fund, the *FixOurFood* programme is one of four consortia that will address various aspects of the UK food system.

FixOurFood Programme

FixOurFood, one of the four 5-year research programmes funded by the BBSRC Transforming Food Systems SPF and led by Prof Bob Doherty at the University of York, brings together a world leading interdisciplinary consortium of five universities (York, Leeds, City, Oxford and Cranfield), as well as a range of partner organisations coupled with an anchor institution platform consisting of key organisations that have an impact in the Yorkshire region (e.g. local economic

partnerships, councils, healthcare providers, civil society groups and universities). The consortium is committed to learning, through a set of action-orientated interventions, how to transform the food system in Yorkshire to one which prioritises dietary health in young people, builds a more diversified hybrid food economy and which sources produce from farmers who promote increased soil health, carbon sequestration and biodiversity. In doing so, *FixOurFood* responds to a number of strategic objectives and recommendations in the National Food Strategy Plan (NFSP) including, escaping the so called 'junk food cycle', new eat and learn initiative in schools (R3), reduced diet related inequality (R4), Holiday Activities and Food Programme (R5), making better use of our land, innovation for a better food system (R11), create a national food system data centre (R12), strengthen government public food procurement (R13) and long-term change in governance and legislation to drive change (R14) (NFS 2021).

The focus on Yorkshire allows us to understand the integrated and complex dynamics of the food system while being sufficiently bounded. The Yorkshire region incorporates diverse elements of food production, supply and consumption. It has the highest concentration of food and drink businesses in the UK and our aim is to improve their social and environmental impact. The variety of farming systems within the region and the diversity of soil and land cover, combined with networks of innovative farmers, makes it an excellent test bed for more regenerative approaches.

FixOurFood conceptual approach

FixOurFood is underpinned by three powerful concepts—food systems, regenerative systems and transformation. It has become something of a truism in food policy to describe food as constituting a 'system', and this concept is invoked far more often than applied satisfactorily (Doherty et al., 2019). Taking a food systems approach (see Figure 1) is the first step since it incorporates all elements and activities that relate to the production, processing, distribution, preparation, consumption and disposal of food. This includes key system outcomes, including food security, availability, utilisation, safety, access to food and of course food waste. In addition, the system also includes the

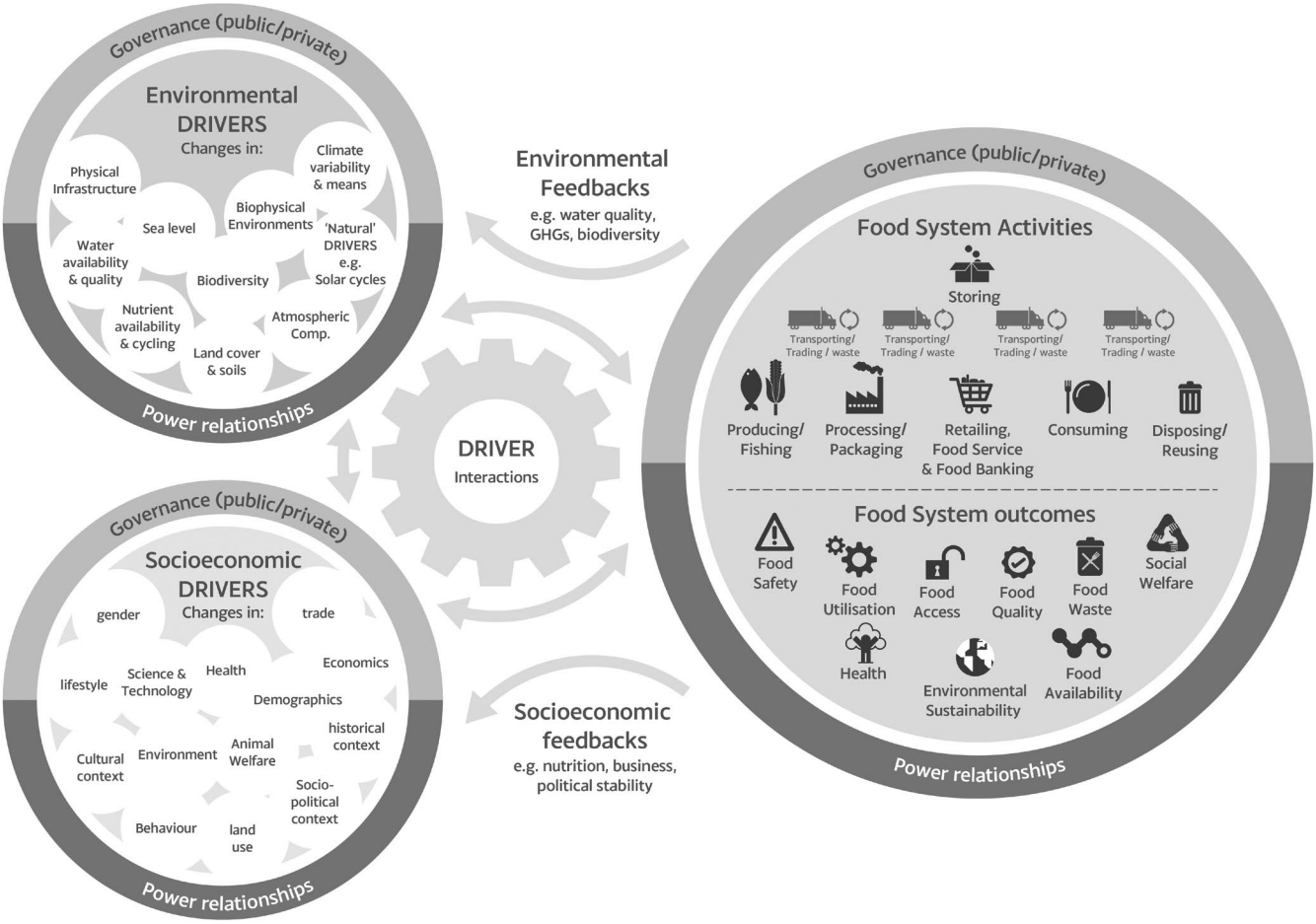

FIGURE 1 Food system

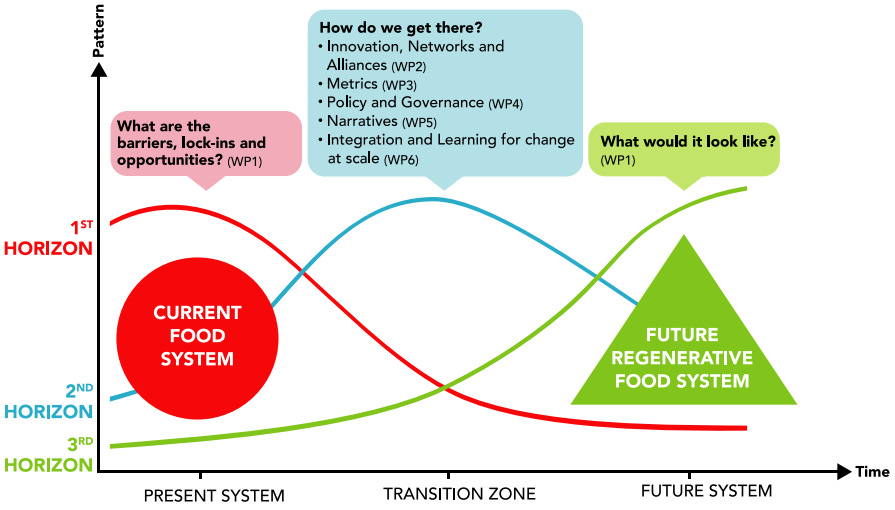

FIGURE 2 The Three Horizons Framework guiding FixOurFood focus on transformation and work package structure

socioeconomic and environmental drivers, including the role of the environment, people, processes, infrastructure, institutions, governance structures and decision-making processes, and the effects of their activities on our society, economy, landscape and climate. Finally, it recognises the forward and backward feedback loops, trade-offs, synergies and unintended consequences among system activities. Looking at food as a system enables you to identify the interrelationships and interdependencies between different groups and provides the basis for wider stakeholder perspectives and the avoidance of silo-thinking.

However, a food system approach (Figure 1 above) alone cannot deliver transformative change (Doherty et al., 2020), hence the need to combine with other concepts to create system change. *FixOurFood* will go well beyond just understanding the challenges to actively supporting and learning about how transformation can be stimulated. Current research shows that transformation requires stimulating major synergistic pattern shifts in subsystems and working with the social dynamics at different scales (Fazey et al., 2017); developing new transformative innovations and niches; and stimulating change in political and socio-technical regimes (Geels, 2014). To navigate these complex issues, we will use the *Three Horizons transformations framework* (Figure 2), which has already been used in our co-creation to identify pockets of innovation (3rd Horizon). This framework will maintain the transformational intent throughout the project.

Our third powerful guiding concept is **regenerative systems**. While recognition of the need for food system transformation is growing, there is limited consensus on what the outcome of such change might look like. Reduction of harm to sustainable levels in food systems is no longer sufficient given that many ecological systems have already passed critical thresholds. Our ambitious work will therefore focus on examining how food systems can be transformed towards having regenerative rather than degenerative dynamics, in which beneficial social and environmental outcomes 'spiral' up in new systemic patterns (Wahl, 2016). A key novel contribution of our research will thus be to develop new concepts of regenerative food system at scale, as well as how system change towards this can be achieved. Our early working definition of a regenerative food system is '*a system which prioritises dietary health as the norm particularly in young people, providing the foundation for life, and a food economy that is purpose driven, providing positive social and environmental change through innovation and which sources produce from farmers who promote soil health, carbon sequestration, biodiversity and nutritious food and who go way beyond harm reduction*'. As we progress, we will build upon this definition combining our synthesis of literature on regenerative approaches in different disciplines with the insights from both the interventions and our stakeholder partners.

We will conduct our research 'from within' the food system rather than from the 'outside looking in'. This is a key assumption underpinning our 5-year research programme and provides new opportunities for co-creation of new knowledge and action, such as 'learning by doing', where stakeholders are viewed as legitimate knowledge producers (Fazey et al., 2018). Such work involves extensive stakeholder engagement and careful considerations of rigour, and requires skills in balancing a need to being closely linked to action while ensuing a critical stance is maintained.

Our approach is thoroughly interdisciplinary, combining health researchers, management academics, soil and plant scientists, biologists, cosmologists, climate scientists, food policy researchers, geographers and sociologists. The *FixOurFood* project is structured into six integrated work-packages (WPs), see Figure 3.

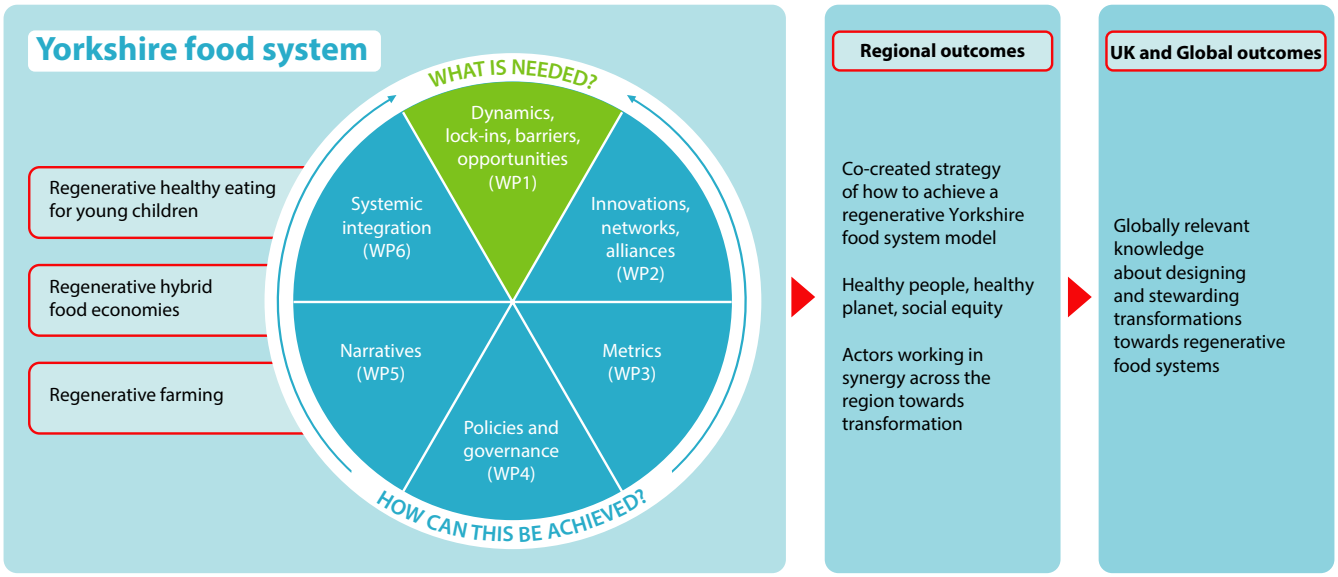

FIGURE 3 FixOurFood work package structure

The work packages

Work Package 1

WP1 (Regenerative dynamics, lock-ins, barriers and opportunities) will focus on addressing the first research question of 'what is needed to create a regenerative Yorkshire food system'. It will do so by clarifying what a regenerative food system would look like for different actors, the lock-ins and challenges inhibiting transformation towards them, and the opportunities (innovations, metrics and policies) for new and emerging patterns of change that can be harnessed to help a new pattern emerge in both Yorkshire and the UK. All the WP teams will work together in WP1 with our key stakeholder platforms, for example School Leaders for Change, Future Farmers platform and our business networks and anchor institutions. The novel future method, '*Three Horizons practice*' (Figure 2), developed to specifically explore transformation (Sharpe et al., 2016), will guide workshops and the outcomes will be supplemented with stakeholder interviews. The interviews will address gaps and widen perspectives and bring in further insights about innovations, metrics and policy/governance to feed into subsequent WPs. WP1 will provide new co-created understanding of what a regenerative food system will look like at scale, system transition maps that outline how change can be leveraged, including critical barriers for each area of intervention and specific plans to guide action in other WPs, including innovations and integrative opportunities that can be harnessed to provide momentum for systemic change.

Work Package 2

WP2 will work with our three integrated intervention sub-systems of: *healthy eating for young children*, *hybrid food economies and regenerative farming* to learn how to stimulate trajectories towards transformation. Each subsystem has a set of questions and interventions to co-produce new research through action. First, healthy eating for young children will map the current food system for food provision and consumption for children in schools and early years' settings in Yorkshire and explore the extent to which innovations (through co-creation) will lead to improved nutritional quality, optimised environments and reduction in GHG emissions. We will also assess how equitable these transformations are across populations. Building on activities in WP1 (see above) and working co-creatively (with our partners at the Food Foundation, our School Leaders for Change, and the teams in sub-systems 2 and 3), we will embed and test feasible interventions that are culturally appropriate and have the potential to benefit both health and the environment. These will include developing a new model of food procurement to schools and nurseries, adapting food environments in early years' and school settings (e.g. trialling a range of menus, improving the dining culture/experience), enhancing food education using new Climate Change educational resources, developing online interactive resources that bring farming to schools and improving food provision in the school holidays. *FixOurFood* will also work with the Local Education Authorities in Yorkshire to evaluate the impact of the Holiday Activities and Food Programme provision on dietary inequalities,

as well as the nutritional, educational, environmental and social impacts of this provision. This series of interventions will clearly provide evidence to inform policy development on some of the key recommendations in the NFSP including, escaping the so called 'junk food cycle', new eat and learn initiative in schools (R3), reduced diet related inequality (R4), and the Holiday Activities and Food Programme (R5).

The second WP2 sub-system is focused on how we establish a more regenerative *hybrid food economy* in Yorkshire. *FixOurFood*, collaborating with the Local Economic Partnership (LEP), will build an entrepreneurial ecosystem of diverse hybrid business models working across the food system which are purpose driven and commercially trade to deliver positive social and environmental change. Hybrid entrepreneurship is defined as 'the innovative use and combination of resources to pursue opportunities to catalyse social change and/or address social and environmental needs' (Doherty et al., 2014). The aims of hybrid approaches are broad, ranging from tackling grand challenges and complex social and environmental problems (Mair and Rathert, 2021), to enabling and assisting the 'excluded and marginalized', such as those experiencing food insecurity (Saebi et al., 2019, p. 73). To this end, we are working with 'Food Hubs' (Guzman & Reynolds, 2019), setting up a new indoor community urban vertical farm (called 'Grow it York'); and designing, with our partners, new public procurement supply chains to, for example schools and holiday clubs with the aim of building a business toolkit for hybrid business models. Our indoor vertical farm called 'Grow it York' is located in the heart of the community in the centre of York, providing produce for both local restaurants and community foodbanks, and exploring how urban vertical farms can best contribute to a regenerative food system. *FixOurFood* is already working with the LEP and Crown Commercial Services to support the development of a new public sector food agreement called 'Buying Better Food', which prioritises the purchasing of local sustainable food from small and medium-sized enterprises and producers. The aim is for this new agreement to be piloted in Yorkshire in 2022/2023 with the support of *FixOurFood* in partnership with the LEP. This work will clearly contribute to policy development around R13 of the NFSP to strengthen government public food procurement. Research on entrepreneurship in the food economy has been overly preoccupied with a focus on individual entrepreneurs and single organisational responses, failing to appreciate the role that entrepreneurial ecosystems could play in food system change.

Our third sub-system *Regenerative farming* seeks to address the decline in soil stocks and fertility, carbon and nitrogen sequestration to regulate climate, terrestrial biodiversity and water quality. *FixOurFood* has formed a stakeholder partnership with Future Farmers in Yorkshire, who are a collection of farmers and organisations working towards regenerative approaches. LaCanne and Lundgren (2018) define regenerative farming as '*farming that increases soil quality and biodiversity*, *while producing nourishing farm produce profitably'*. Regenerative farmers work towards a set of guiding principles including reduced tillage, no bare soil (use of cover crops), fostering plant diversity, integrated crop-livestock approaches and increased rotation. *FixOurFood* is working with our networks to answer a set of key research questions to identify the practical steps needed to stimulate shifts towards regenerative farming. These include: What are the limiting environmental, social and economic factors for regenerative farming?; What changes in practice would allow different farming systems in Yorkshire to be regenerative and financially viable?; and What contribution could regenerative approaches make to combat global warming if scaled up nationally? *FixOurFood* will test a series of practice-based interventions that will be trialled at University of Leeds Smart Farm and will support a series of additional interventions including demonstrations of regenerative farming practices on commercial farms (using our farming networks), increasing awareness of regenerative farming and facilitating peer-to-peer learning. Training events will be held and communications for farmers on regenerative practices will be developed. This supports policy development in the NFSP around making better use of land.

Data from our farm interventions will be evaluated with the Silsoe Whole Farm Model (SFARMOD) (Harrison et al. 2019) to analyse the impact of farming changes on whole-life cycle GHG emissions and to guide farming practice for long-term profitability and environmental sustainability. We will extend the model to include regenerative farming practices, new farming systems and environmental factors including soil quality, land use change, net energy balance, carbon sequestration options and environmental emissions to water and air. The modelled GHG fluxes for the Yorkshire farming systems (with different interventions included) will link changes in farming practices to the impact on GHG emissions and contributions to reducing future global mean surface temperature, based on methods that emulate full climate models (Cain et al., 2019). This will enable us to identify practices that are most effective at reducing global warming and enhancing environmental and business value. This work will support policy development particularly around the National Food Data Centre (R12 in the NFSP).

To integrate the work across the sub-systems, regenerative farm produce will be aggregated and coordinated by our hybrid business models to supply new public procurement and private sector supply chains, particularly to our Leaders for Change Schools. We will increase the visibility of regenerative farming and its impacts to consumers. Some of our regenerative farming partners will co-design with schools and run half-day

study tours for farmers and schools in our Leaders for Change group.

Work Package 3

In WP3, *FixOurFood* will iteratively co-create and define a set of *Food System metrics* that signal progress towards transformation to a regenerative UK food system. This could support the creation of a National Food System Data programme (NFSP R12). Several of the metrics currently under consideration overlap with those in R12 (NFSP Table 1, p. 250), ranging from on farm decisions, manufacturing and supply chain records to consumer-end perceptions and outcomes. Furthermore, we are identifying potential interventions from across the food system, from farm to consumer and creating a model to connect these to the metrics, which could support the NFSP goal to model future scenarios and assess the effectiveness of different policies or logistical models (NFSP p. 249). In addition, *FixOurFood* is creating a web-interfaced dashboard to this model, allowing stakeholders and the public to test potential interventions against each other and quantitatively compare their total effectiveness against targets for transformation, thus supporting the NFS goal 'to create a clear, accessible and evolving picture of the impact our diet has on nature, climate and public health, to help guide decision making throughout the food system' (NFSP p. 249). Not only will the dashboard allow stakeholders to improve their decision-making, but it will also highlight research needs and provide a way to engage with schools and the wider public, to help establish a well-informed public dialogue about food system transformation.

Work Package 4

In WP4, transformational change to achieve a regenerative food system will require innovation in public policies and governance to activate transformative change at the Yorkshire and UK levels (NFSP R14). *FixOurFood* aims also to change the governance of transformation itself by setting up a new *Food Systems Council of Yorkshire* to drive change towards a regenerative food system and to advocate for cross government governance structures to provide solutions to food system challenges. The delivery of these policies will also require decision-making processes (governance) that are fit-for-purpose for transformational change. There is already policy, practice and innovation in place in Yorkshire, as well as nationally, aiming to support young children's diets, to create good growth, whilst at the same time reducing the environmental impact of farming. While these policies do not have regeneration as an explicit goal, they represent existing activity and provide a base to build from and practical influencing opportunities. Existing policies also provide a source of learnings about what is already preventing more transformative change. We will seek to draw on this knowledge to assess how existing policies affect the Yorkshire and UK Food System and how related decisions are made. Specifically, *FixOurFood* will focus on the interactions between national-, regional- and local-level food policy, as well as the institutional environments that can contribute to greater policy coherence. WP4 will also examine the more diffuse governance structures – the decision-making processes, institutions and networks – that impact Yorkshire and UK-level food systems that exist both within and outside of formal policy processes.

Work Package 5

In WP5 (Narratives for Transformation), *FixOurFood* will work in the Yorkshire food system with both the anchor institutions platform and our interventions to understand the different narratives about food and how these could more effectively support system transition. Socio-cultural aspects (e.g. values, norms and identities) are critical in shaping and reproducing social practices, policies and decisions (O'Brien, 2018). Such aspects are often reflected in narratives (Veland et al., 2018), which have an important sense-making function, providing interpretive frameworks that help construct collective identities and values that link past, present and future possibilities, and thus both help and hinder collective agency and decision-making (Riedy et al., 2019). Narratives thus play a critical, albeit often overlooked aspect of food system and their transition. We will therefore work to identify the core narratives of different stakeholders and, going beyond conventional studies, co-create new narratives to support transformation, in combination with the work of other WPs. This work will take place in years 2–5 of the programme, building on the initial phases of other WPs. The outcome will be highly visual narratives embodying future aspirations and visions for change.

Work Package 6

Finally in WP6, our focus will be integration and learning for change. System change is a complex process that requires a whole system perspective capable of integrating insights across different actors, sub-systems and social scales. This WP will thus bring together the learning from other WPs to understand how change for the Yorkshire food system will continue to lead to transformation and how insights can be scaled across the UK and globally. This WP will view the whole programme as an 'experiment' in co-creating change, from

which critical learning about transformation in practice can emerge. The 'intervention' will primarily be focused around delivery of WPs 1–5, which are highly action-oriented and have extensive stakeholder engagement. WP6 will add to this by delivering actions aiming to integrate, cohere and support co-creation of change at scale. These actions include stimulating programme team learning across the subsystems and more widely by holding three Yorkshire regenerative food system summits to engage a large number of actors, build shared direction and gradually enhance wider ownership of the change process. *FixOurFood* will actively transition governance of the change away from the programme team to ownership by a new legacy platform, the Food Systems Council for Yorkshire, who will ensure change continues well beyond the end of our programme. The Council will include several members of our Stakeholder Advisory Board. Thus, our ambition to support and enable transformative change in the Yorkshire food system is clearly audacious and a full transformation will take many years beyond this programme's timeframe. Yet our goal is achievable by seeking to set the scene and steward trajectories and innovations for such change. This will be aided by the strategic futures methods that will be employed to convene different actors' voices and link and cohere these through actions and activities at the whole system scale. Over time, we seek to change the narrative, capitalising on the already and many different stressors affecting the existing food system and wider changes and desires for something different.

CONCLUSIONS

The *FixOurFood* programme began in January 2021 and will conclude in December 2025. While it is premature to predict the full implications of our proposed research, we aim to achieve a transformative impact on the Yorkshire food system. Regenerative systems represent a guiding concept of the programme. While recognition of the need for food system transformation is growing, there is limited consensus on what the outcome of such change might look like. *FixOurFood* works with the understanding that a reduction of harm to sustainable levels in the food system is no longer sufficient given the negative impacts on public health and that many ecological systems have already passed critical thresholds. Our ambitious work will thus focus on examining how food systems can be transformed towards having regenerative rather than degenerative dynamics, with beneficial social and environmental outcomes 'spiralling' up in new systemic patterns, as well as how such transformations can be governed and managed in practice.

Integration is at the heart of this consortium, which brings together a range of disciplines and methods expertise, integrated via the transformation steps and cross-cutting interventions. For example, in WP3, identification of metrics for systems-level transformation will require knowledge and participation across all three subsystems in WP2. This way of working will allow us to consider a transformation of the early years' and school food system that moves beyond traditional narratives of improvement to health and education to one that also benefits our planet. Through co-design, we will consider opportunities to do this by integrating partnerships with regenerative farming and hybrid business economies; allowing us to move towards our vision where tasty, good quality, sustainable food is the 'default' and easiest choice for all children. At the heart of this vision is that *all* children have an opportunity to benefit. This moves beyond the concept of equity towards approaches which seek to provide the most benefit to those needing it most. Our WP6 is dedicated to using interdisciplinary Yorkshire food system summits to stimulate transformational learning across disciplines, which all team members and the anchor institutions will participate in. Working across the food system, we aim to deliver much needed improvements in children's nutrition, and provide a pathway for scaling this up elsewhere across a range of demographics.

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