



# Rebuilding a Resilient Britain: Land Use

## Report from Areas of Research Interest (ARI) Working Group 6

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## Foreword

The COVID-19 pandemic presents a fundamental challenge to our society, economy, and ways of living. We need to ensure that our response to these challenges is informed by the best possible evidence, by engaging with the right stakeholders. As a first step toward this goal, the 'Rebuilding a Resilient Britain' programme of work was launched in July 2020 to bring together researchers, funding bodies and policy makers to identify evidence and uncover research gaps around a set of cross-cutting Areas of Research Interest.

ARIs were initially developed in response to the recommendations of the *2014 Nurse Review of Research Councils*, which called on government departments to communicate clearly where their research objectives lie. The ARIs take the form of an annually updated list of priority research questions, which invite the academic community to engage with government departments to inform robust evidence-based policy making.

With the advent of the COVID-19 pandemic, however, it became clear that the societal issues affecting Britain's recovery over the medium- to long-term cut across departments. The ESRC/GOS ARI Fellows therefore worked with the CSAs and Council for Science and Technology to identify a set of ARIs relevant across all departments and sectors. Under the meta-themes of **Rebuilding Communities**, **Environment and Place**, and **Local and Global Productivity**, each led by two CSAs, nine Working Groups were formed:

<b>Rebuilding Communities</b> led by Robin Grimes (MoD Nuclear CSA) and Osama Rahman (DfE CSA)	<b>Environment and Place</b> led by Robin May (FSA CSA) and Andrew Curran (HSE CSA)	<b>Local and Global Productivity</b> led by Paul Monks (BEIS CSA) and Mike Short (DIT CSA)
1. Vulnerable Communities	5. Supporting Lower-Carbon Local Economies	8. Local and National Growth
2. Supporting Services	6. Land Use	9. Trade and Aid
3. Trust in Public Institutions	7. Future of Work	
4. Crime Prevention		

With input from the Universities Policy Engagement Network, UKRI, the What Works Centres, and the National Academies, each Working Group was populated with subject experts and representatives from funding bodies and government departments.

The working groups met several times over the summer and used their networks to:

- a. identify a diverse range of existing or ongoing research,
- b. synthesise evidence which can be quickly brought to bear on the issues facing departments
- c. identify research gaps in need of future investment.

This report represents the culmination of the work of one of these Working Groups. The expedited timeframe of this work, along with their specific areas of expertise, led to some variation in how each group approached the task. It should be noted that this document represents the views of the Working Group members and is not indicative of government policy.

As well as providing deep expert reflection on the cross-cutting ARIs, it is hoped that these reports, and the work that led to it, will prompt further collaboration between government, academia, and funders. Working across government and drawing from the extensive expertise of our academic community will be essential in the recovery from the COVID-19 pandemic, to rebuild a resilient Britain.

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ESRC/GOS ARI Fellows, on behalf of the ARI team within GOS

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## List of acronyms

AI	Artificial Intelligence
ARI	Area of Research Interest
AHRC	Arts and Humanities Research Council
BAME	Black, Asian and Minority Ethnic
BBSRC	Biotechnology and Biological Sciences Research Council
BEIS	Department for Business, Energy and Industrial Strategy
CBI	Confederation of British Industry
CJS	Criminal Justice System
CO	Cabinet Office
COVID-19	Coronavirus Disease 19
CSA	Chief Scientific Advisor
DCMS	Department for Digital, Culture, Media and Sport
Defra	Department for Environment, Food and Rural Affairs
DfE	Department for Education
DfT	Department for Transport
DH	Department of Health
DHSC	Department of Health and Social Care
DIT	Department for International Trade
DWP	Department for Work and Pensions
EPSRC	Engineering and Physical Sciences Research Council
ESRC	Economic and Social Research Council
FCDO	Foreign, Commonwealth and Development Office
FSA	Food Standards Agency
GCSA	Government Chief Scientific Advisor
GOS	Government Office for Science
HMRC	Her Majesty's Revenue and Customs
HMT	Her Majesty's Treasury
HO	Home Office
HSE	Health and Safety Executive
MHCLG	Ministry of Housing, Communities and Local Government
MoD	Ministry of Defence
MoJ	Ministry for Justice
MRC	Medical Research Council
NERC	Natural Environment Research Council
NGO	Non-Governmental Organisations
NICE	The National Institute for Health and Care Excellence
ONS	Office for National Statistics
PHE	Public Health England
R&D	Research and Development
SAGE	Scientific Advisory Group for Emergencies
SME	Small and Medium-sized Enterprises
STEM	Science, Technology, Engineering, and Mathematics
STFC	Science and Technology Facilities Council
UKRI	UK Research and Innovation

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## 1. Chair's introduction

There is a significant evidence base around the role of community-led organisations in supporting and promoting local sustainable growth. This relates to cross-cutting issues in terms of biodiversity, housing, renewable energy and food production. What is less clear is how these organisations can be supported to overcome financial, legal and ownership barriers so they can support the post-COVID recovery.

There is a significant evidence base on the enduring spatial and social inequalities within the UK, especially in terms of land uses and values. What is less clear is what mechanisms and policies are needed to overcome this uneven UK geography.

Despite considerable evidence of the deficiencies of current UK food systems there is a need for more constructive and methodological development on how to transform and adjust current food system and chain dynamics such that they can mutually reinforce the key objectives for sustainable food systems.<sup>1</sup> Land use, management and development is a key component of this process of transformation. More generally action-based and intervention-oriented research involving multiple stake-holders and interests is needed to progress sustainable and multifunctional land use which integrates food production with other key land use demands, such as renewable energy, agro-forestry, amenity and housing developments.

The importance of a systems approach is becoming increasingly recognised for addressing complex systems such as food systems. However much of the existing evidence focusses on components of the system rather than the linkages and trade-offs in the system. This has not always been useful in providing evidence to address how best to make policy for and/or managing complex socio-ecological systems as exemplified by Land Use decision making. New Strategic Priority Fund programmes such as Transforming the UK Food <sup>2</sup> will offer systems evidence and can provide the foundations for future research in this area, building on the very successful Rural Economy and Land Use programme which helped stimulate interdisciplinary research on socio-ecological systems.

New evidence needs to be developed in what some call action research. For example, in his work chairing the National Food Strategy, Henry Dimbleby has proposed that we need more evidence collected on actual interventions and actions as opposed more theory development on what we should eat and why. Such action research can be difficult on many fronts, especially if it involves experiments on real systems, but there is an evidence gap on what works and does not work being

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<sup>1</sup> See recent EU Group of Chief Scientific Advisors Report No 8 (May 2020): Towards a sustainable food system

<sup>2</sup> <https://www.foodsecurity.ac.uk/research/foodsystems-spf/>

considered symptomatically and is something frequently raised in our conversations with government officials.

## **2. How the evidence was identified and collated**

The Working Group on Land Use was asked to focus on 4 ARIs originally. The working group felt that this was not reflective of the priorities shared by on the topic of land use across governmental departments.

In order to identify a meaningful set of priorities, the Working group engaged government officials in conversation to identify a further set of questions. This report therefore reports the set of ARIs which have been developed in conversation with MHCLG and Defra relating to Land Use.

## **3. Key messages**

There are currently major limits in the way that land is allocated, owned, managed and used in the UK: the current system isn't achieving its intended goals that result from optimal land use, and this leads to a wide range of suboptimal policy outcomes (including environment, public health).

These ARIs are therefore all about cross-working, but it was noticeable to the Working Group that different departments do not appear to see these themes as cross-cutting. The Working Group has therefore put quite an emphasis on trying to make all the sections below cross-cutting. To resolve UK land issues novel cross-department working will be required which overcome established silo working.

Land use is critical to building resilience in the UK post-COVID landscape, which makes these ARIs fundamental to the whole ARI exercise.

Improving land use is also how we will deliver on global responsibilities associated with climate change and the Sustainable Development Goals.

The World Health Organisation believes that Sustainable Development Goals are the most effective way to deliver good public health: environmental support for good public health is now centre stage, so land use and public health are closely linked.

Access to and integration of data is essential for generating the evidence needed to help enable effective and appropriate policy/decisions. This involves more than considering public sector owned data, albeit that is important, but needs to include private and third sector data, which in spite of talk of recognition for open data and data sharing, is still not widespread.

## 4. ARIs developed by this group

### 4.1. How does land use and development serve communities best?

- How can land use, supply and demand be balanced and optimised between areas of the country?
- What has been shown to work effectively in shaping Governments' role in land use management to drive sustainable local sustainable growth?
- How important are amenity, social, health and ecological benefits in ensuring community gains when land use changes?
- What do communities' value and understand in terms of how land is used and allocated? And to what extent does this change in different geographical areas? What is the most effective way of ensuring these values are recognised and recirculated locally and regionally for the public good?
- How do you capture the value of an amenity for the benefit of local communities, and which ones create co-benefits? What value gets recirculated on the basis of development gain, and recirculated to whom? How can more value be retained locally to support COVID-19 recovery?
- What is effective in increasing the transparency, accessibility and availability of data for development on land to community and public bodies through increased digitalisation of the planning process?

### 4.2. How do we overcome the uneven development of the UK?

- What are the key elements of a coherent spatial strategy that balance and optimise land use in different regional contexts and for different types of inequality?
- How to ensure the maintenance and improvement of a range of economic, ecological and social benefits to land functions when land use changes?
- How to balance local community needs for land (e.g. recreation, amenity, woodland amenity) with use for other purposes (housing, infrastructure, transport etc)
- Given recognized population and density pressures, what planning principles would underpin a flexible, socially and ecologically equitable approach to development based on key priorities such as net zero place making?
- How could we regenerate and finance existing city spaces along net zero and active travel neighbourhood principles?
- What constitutes a sustainable community? And how can in practical ways local communities and neighbourhoods achieve this, especially in terms of relocalisation and ideas such as the 15-minute neighbourhood?
- How can government, market and civic actions and actors co-produce solutions to foster this process?
- How can current land uses and occupancy be adjusted to deliver sustainable communities?



- How could government interventions promote more equitable outcomes to land use policies while meeting public health, climate and biodiversity targets?

### **4.3. How can UK land use change better deliver multiple outcomes for people's health and prosperity to deliver a just transition for all?**

- What roles do green jobs, local employment, renewables, recreation, and thriving biodiversity play in delivering these multiple outcomes?
- What is most effective in designing nature-based solutions to meet the net zero place making challenge?
- What can we learn from other countries about how can spatial planning be best used to support design green infrastructure and improve mental and physical health?
- What are the legislative, sociocultural and regulatory barriers that need to be overcome to transform UK land use towards sustainable production systems and ecosystem services? What are the risks of unintended and inequitable consequences and how can they be mitigated?
- How will crop, livestock and woodland resilience alter in a changing climate, impacting optimal agricultural, amenity and forestry practices for the UK? 'What works' in terms of increasing resilience in these areas?
- What is the greenhouse gas emissions reductions potential of different land-based interventions per unit area per year? How does this change over time and what are the timeframes for delivery from implementation? What the potential for both urban, rural and peri-urban interventions?
- What are the real-world barriers that prevent land-users and owners taking up low/negative carbon measures, and how can these be overcome? How can we improve the estimation and validation of take up for these practices?
- How can a more integrated and regionally sensitive approach to land use be developed through aligning climate change objectives (adaptation and mitigation) with objectives for biodiversity, social equity and ecosystem services. How can the environmental co-benefits of mitigation actions be identified and quantified?
- What are the competing pressures, trade-offs and synergies of different land-use in relation to climate change in a post-COVID world?
- Can other land-based approaches to greenhouse gas removal such as enhanced weathering and biochar as well as place-based approaches such as local reforestation help achieve net zero without negative environmental impacts?

### **4.4. Land ownership, governance and finance**

- Financial flows and capital release – how can we ensure equitable and more fluid flows of capital so that land can address climate emergency and social justice?
- How can land be released for more local community needs (e.g. growing, recreation, amenity, woodland amenity)?
- Liquidity in land for community benefit – how can we ensure release of land to meet urgent social-ecological objectives of COVID-19 recovery?

- Development and green recovery – what mechanisms could ensure that under-used or ‘banked’ land is released to stimulate an equitable green recovery (for biodiversity, community renewables, community housing, active travel, amenities)
- Which new mechanisms for community ownership –grants and support organisations for cooperatives, Community Land Trusts, custom build, cohousing etc – could help the UK achieve its priorities for land use most cost-effectively?
- What relationships between different scales of ownership: local, national and international – could help ensure a coherent UK spatial plan to avoid overheating, dereliction especially within and between regions?
- What are the implications for how ‘levelling up’ subsidy regimes are designed and the levels of in spending per head (e.g. for arts, transport, greenspaces)
- How can new re-localised and regionalised markets for environmental goods and services be created?
- Is the allocation of land to different transport types (private vehicle, active travel) optimised to ensure climate, social and health objectives are met?

#### **4.5. How can we deliver early warning systems to monitor signals in the environment relevant to public health and other societal outcomes?**

- Monitoring the prevalence of COVID-19 and similar viruses through water systems.
- Developing environmental surveillance and/or sentinel systems offering early warning signals
- Better tracking for safety and sustainability of UK food production
- How can we develop effective early warning systems that are able to assess and interpret a wide range of signals in local environmental systems (e.g. covering flooding, biodiversity loss, amenity loss, air pollution, soil loss)?
- How do we use new sensor capability, and combine it with data analytics to deliver predictive capability from near real time to multiyear scenario planning?
- How can we develop accurate biological sensors throughout the food system to detect changes/ issues in real time combined with decision support tools?

#### **4.6. What is the role for UK land in supplying healthy, safe, sustainable and affordable food, and how can innovation boost productivity to transform the UK food and farming system?**

- How to maintain food security and equitable access to a decent diet in the face of challenges such as a rapidly growing population, changing consumption trends, changing climate, globalized markets and black swan events such as COVID-19?
- How best to develop agritech, robotics and automation to drive change and enable UK food and farming sectors to compete globally?
- How do the public view the role of the technologies above in the transformation of the UK’s agri-food system post-Brexit?

- How can we prepare for divergent regulatory frameworks (in the USA, European Union and other trading nations) for agricultural inputs such as seeds and livestock?
- Use of new data science techniques, including AI, to unlock opportunities for improved and more efficient environmental monitoring, regulatory compliance and land management
- How to value changes in land use / use of an amenity and the implications for regulation and access
- How to incorporate effective local and regional approaches into the development of more resilient food supply chains, processing infrastructures and public sector food procurement processes
- How to create a growth in shorter- more localised and regionalised food supply chains? How to invest in local urban and regional food processing infrastructures and market innovations?
- How to stimulate local and regional food procurement in the public sector (post-COVID and Brexit)?
- How to extend knowledge networks advisory and extension systems and new innovations to landholders and farmers?
- How can under-utilised urban land be used to support a supply of nutritious affordable food?

#### **4.7. How can management of the UK's land use footprint in other countries reduce likelihood of zoonotic disease emergence along with improved sustainability outcomes?**

- How do we deploy science and technology innovations to help deliver a risk-based approach to animal and plant biosecurity, i.e. to move from post-disease/outbreak surveillance to pre-emergence surveillance and mitigation of risks?
- How will the prevalence and incidence of animal and plant pathogens in domesticated organisms and wildlife adjust to climate change?
- How can we better join up animal and human health research, capability and digital backbone across government to facilitate agile responses?
- How to assess and reduce the role of UK imports in driving biodiversity loss, climate change, chemical pollution and the introduction of alien species
- How do we better understand how the UK land use promotes zoonosis emergence, and environmental transmission and can it be used to create barriers to spread?
- How can we build resilience in food systems, recognising that prevention is better than cure?
- How can we boost productivity on existing agricultural land whilst using less inputs (nitrogen, pesticides, water)?

- How can UK research and insights support sustainable urban development and SDG11 in the global south in ways that will reduce peri-urban sprawl and the urban encroachment on pristine ecosystems?

## **Annex 1: List of participants and contributors**

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## Annex 2: Evidence and Resources

ARI	Evidence and Resources
<p>How can UK land use change better deliver multiple outcomes for people's health and prosperity in an inclusive and equitable way, i.e. balancing trade-offs and synergies around flood protection, carbon sequestration, green jobs, recreation, thriving biodiversity, clean water and air?</p>	<p><b>Other ongoing work to be aware of:</b></p> <ul style="list-style-type: none"> <li>• Strategic Priorities Fund on Food Systems</li> <li>• Royal Academy of Engineering: Net-zero policy work</li> <li>• Royal Academy of Engineering: Sustainable Living Spaces</li> <li>• Royal Society work on agriculture and food</li> <li>• Centre for Ageing Better interest in housing design, involvement in Home of 2030 competition and accessible housing options and Centre for Ageing Better work on social infrastructure</li> </ul> <p><b>On Land Values and Concentrated Ownership:</b></p> <ul style="list-style-type: none"> <li>• Scottish Land Commission 2019 investigation into Issues Associated with Large Scale and Concentrated Land Ownership in Scotland (Glenn et al., 2019)</li> <li>• Roberts, C., Blakeley, G., and Murphy, L. 2018. A Wealth of Difference: reforming the taxation of wealth. Institute for Public Policy Research, Discussion paper, 26.</li> <li>• Corlett A, 2018. Passing on: options for reforming inheritance taxation, Resolution Foundation</li> </ul> <p><b>On aligning agriculture with sustainable food systems for better public health:</b></p> <ul style="list-style-type: none"> <li>• Poux, X and Aubert, P. M. 2018 'An agroecological Europe in 2050: multifunctional agriculture for healthy eating. Institute for Sustainable Development and International Relations</li> <li>• Lang, T. 2009 'Reshaping the Food System for Ecological Public Health' J Hunger Environ Nutr. 4(3-4): 315–335.</li> <li>• Marsden, T. 2010. Food 2030: Towards a Redefinition of Food? A Commentary on the New United Kingdom Government Food Strategy. The Political Quarterly, 81, 443-446</li> <li>• Tilzey, M. 2000. Natural areas, the whole countryside approach and sustainable agriculture. Land Use Policy, 17, 279-294.</li> </ul> <p><b>On multifunctionality, productivism and post-productivism:</b></p> <ul style="list-style-type: none"> <li>• Marsden, T. &amp; Sonnino, R. 2008. Rural development and the regional state: Denying multifunctional agriculture in the UK. Journal of Rural Studies, 24, 422-431</li> <li>• Tilzey, M. &amp; Potter, C. 2008. Productivism Versus Post-productivism? Modes of Agri-Environmental Governance in Post-Fordist Agricultural Transitions. In: Robinson, G. (ed.) Sustainable Rural Systems: Sustainable Agriculture and Rural Communities. Aldershot: Ashgate.</li> <li>• Phillipson J, Gorton M, Turner R, Shucksmith M, Aitken-McDermott K, Areal F, Cowie P, Hubbard C, Maioli S, McAreavey R, Souza-Monteiro D, Newbery R, Panzone L, Rowe F, Shortall S. The COVID-19 Pandemic and Its Implications for Rural Economies. Sustainability 2020, 12(10), 3973.</li> <li>• UKRI Landscape Decisions Research Programme <a href="https://landscapedecisions.org/">https://landscapedecisions.org/</a></li> </ul>

	<ul style="list-style-type: none"> <li>• Royal Society Food, Farming &amp; Countryside Commission 'Our future in the land' <a href="https://ffcc.co.uk/assets/downloads/FFCC-Our-Future-in-the-Land.pdf">https://ffcc.co.uk/assets/downloads/FFCC-Our-Future-in-the-Land.pdf</a></li> <li>• Defra Environmental Land Management Tests and Trials Quarterly Evidence Report, July 2020</li> <li>• Countryside and Community Research Institute COVID-19 and sustainable food systems: a shared learning resource <a href="http://www.ccri.ac.uk/COVID-19-food-system/">http://www.ccri.ac.uk/COVID-19-food-system/</a></li> <li>• Reed MS, Kenter JO, Hansda R, Martin J, Curtis T, Prior S, Hay M, Saxby H, Mills L, Post J, Garrod G, Guy JA, Proctor A, Whittingham M, Collins O, Stewart G. Social barriers and opportunities to the implementation of the England Peat Strategy : Final report. Newcastle upon Tyne: Newcastle University, Natural England and Defra, 2020.</li> <li>• Strategic Priorities Fund on Landscape Decisions: Towards a new framework for using land assets.</li> <li>• NERC-led Programmes include: Future of UK Treescapes; Valuing Nature; Biodiversity and Ecosystem Service Sustainability; Sustainable Aquaculture; UK Droughts and Water Scarcity; Understanding Effective Natural Flood management; Security of Supply of Mineral Resources; LOCATE and UK-SCAPE NC Programmes.</li> <li>• BBSRC and NERC joint programmes Soil Security programme, SARISA, ASSIST, SARIC, UK Aquaculture Initiative</li> <li>• UK Centre For Ecology &amp; Hydrology land cover maps, Drought and Water resource portals.</li> <li>• Strategic Priorities Fund Food Systems Programme</li> <li>• Circular Economy Centres programme (depending on project portfolio)</li> <li>• Phillipson J, Gorton M, Turner R, Shucksmith M, Aitken-McDermott K, Areal F, Cowie P, Hubbard C, Maioli S, McAreavey R, Souza-Monteiro D, Newbery R, Panzone L, Rowe F, Shortall S. The COVID-19 Pandemic and Its Implications for Rural Economies. <i>Sustainability</i> 2020, 12(10), 3973 Rural economies face particular challenges arising from COVID-19 but have also demonstrated resilience and adaptability in previous crises. Includes list of key policy and research questions for consideration around changes in household, business and supply chain behaviours in rural areas brought on by crisis and future recovery.</li> </ul> <p><b>On shaping the research system for competitiveness and sustainability:</b></p> <ul style="list-style-type: none"> <li>• Chataway, J., et al. (2006). "The governance of agro- and pharmaceutical biotechnology innovation: Public policy and industrial strategy." <i>Technology Analysis &amp; Strategic Management</i> 18(2): 169-185</li> <li>• Gaëtan Vanloqueren, Philippe V. Baret (2009) How agricultural research systems shape a technological regime that develops genetic engineering but locks out agroecological innovations <i>Research Policy</i> 38 971–983, doi:10.1016/j.respol.2009.02.008</li> <li>• Albie Miles, Marcia S. DeLonge &amp; Liz Carlisle (2017) Triggering a positive research and policy feedback cycle to support a transition to agroecology and sustainable food systems, <i>Agroecology and</i></li> </ul>
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	<p>Sustainable Food Systems, 41:7, 855-879, DOI: 10.1080/21683565.2017.1331179</p> <p><b>On agritech innovation and systemic change:</b></p> <ul style="list-style-type: none"> <li>• El Bilali, H. (2019). "The Multi-Level Perspective in Research on Sustainability Transitions in Agriculture and Food Systems: A Systematic Review." Agriculture 9(4): 74 <a href="https://doi.org/10.3390/agriculture9040074">https://doi.org/10.3390/agriculture9040074</a></li> <li>• Klerkx, L. and S. Begemann (2020) "Supporting food systems transformation: The what, why, who, where and how of mission-oriented agricultural innovation systems." Agricultural Systems 184: 102901, <a href="https://doi.org/10.1016/j.agsy.2020.102901">https://doi.org/10.1016/j.agsy.2020.102901</a></li> <li>• Ingram, J. (2018). "Agricultural transition: Niche and regime knowledge systems' boundary dynamics." Environmental Innovation and Societal Transitions 26: 117-135 <a href="https://doi.org/10.1016/j.eist.2017.05.001">https://doi.org/10.1016/j.eist.2017.05.001</a></li> </ul> <p><b>On regulatory dynamics (post-Brexit):</b></p> <ul style="list-style-type: none"> <li>• Lydgate, E. et al (2019) Brexit food safety legislation and potential implications for UK trade: The devil in the details. UK Trade Policy Observatory <a href="https://blogs.sussex.ac.uk/uktpo/files/2019/10/UKTPO-Briefing-Paper-37.pdf">https://blogs.sussex.ac.uk/uktpo/files/2019/10/UKTPO-Briefing-Paper-37.pdf</a></li> <li>• Lydgate, E. et al (2020) Toxic trade: how trade deals threaten to weaken UK pesticide standards, <a href="https://issuu.com/pan-uk/docs/toxic_trade_report_2020?fr=sM2MwNTEsOTMxNQ">https://issuu.com/pan-uk/docs/toxic_trade_report_2020?fr=sM2MwNTEsOTMxNQ</a></li> <li>• GEAP3 (2020) Genome editing in agriculture: Regulation in the United Kingdom after Brexit, available with other briefings at <a href="https://www.geap3.com/policy-hub">https://www.geap3.com/policy-hub</a></li> </ul>
<p>What is the role for UK land in supplying healthy, safe, sustainable and affordable food, and how can innovation boost productivity to transform the UK food and farming system?</p>	<ul style="list-style-type: none"> <li>• Royal Society work on <u>agriculture and food</u></li> <li>• Benton, TG and Bailey, R 'The Paradox of Productivity: Agricultural Productivity Promotes Food System Inefficiency' (2019) 2 Global Sustainability 1. The principal policy focus for food on increasing agricultural productivity and liberalizing markets allowing globalized trade has led to growth in the supply of agricultural produce, more calories becoming available, and price declining but drives food waste, underpins diets creating malnourishment through obesity, and global competition incentivizes producers who can produce the most, cheaply, typically with environmental damage. Proposes refocusing away from yields per unit input, to the food system's overall productivity and efficiency – the number of people that can be fed healthily and sustainably per unit input.</li> <li>• Poux, X and Aubert, P. M. 2018 'An agroecological Europe in 2050: multifunctional agriculture for healthy eating. Institute for Sustainable Development and International Relations. Modelling indicates that Europe could transition from a food importing region to a food sufficient region while simultaneously reducing its area under agricultural land use and using less productive methods if it were to orient its agriculture towards healthy diets aligning with public health recommendations.</li> <li>• Lang, T. 2009 'Reshaping the Food System for Ecological Public Health' J Hunger Environ Nutr. 4(3-4): 315–335. Proposes that</li> </ul>



	<p>while previous policies needed to address underconsumption, today's challenges are a combination of over- under- and mal-consumption, alongside increasing inequalities. Introduces a new paradigm of 'ecological public health' in which food links human and planetary health. Suggests 7 priorities for policy.</p> <ul style="list-style-type: none"> <li>• Marsden, T. 2010. Food 2030: Towards a Redefinition of Food? A Commentary on the New United Kingdom Government Food Strategy. <i>The Political Quarterly</i>, 81, 443-446. Critique of UK government food strategy</li> <li>• Tilzey, M. 2000. Natural areas, the whole countryside approach and sustainable agriculture. <i>Land Use Policy</i>, 17, 279-294. Highlights the dichotomy between productivity and conservation and suggests possible ways for better integrating food production and the environment</li> <li>• Marsden, T. &amp; Sonnino, R. 2008. Rural development and the regional state: Denying multifunctional agriculture in the UK. <i>Journal of Rural Studies</i>, 24, 422-431. Discusses possibilities for multifunctional agriculture which enhances the environment while providing livelihoods and food.</li> <li>• Tilzey, M. &amp; Potter, C. 2008. Productivism Versus Post-productivism? Modes of Agri-Environmental Governance in Post-Fordist Agricultural Transitions. In: Robinson, G. (ed.) <i>Sustainable Rural Systems: Sustainable Agriculture and Rural Communities</i>. Aldershot: Ashgate. Critiques the perception that Europe has moved towards a post-productivist era and argues that the policies which support conservation and livelihoods for some types of agriculture serve to justify continued and increased productivism (at the cost to the environment and livelihoods) in other areas.</li> <li>• Phillipson J, Gorton M, Turner R, Shucksmith M, Aitken-McDermott K, Areal F, Cowie P, Hubbard C, Maioli S, McAreavey R, Souza-Monteiro D, Newbery R, Panzone L, Rowe F, Shortall S. <u><a href="#">The COVID-19 Pandemic and Its Implications for Rural Economies</a></u>. <i>Sustainability</i> 2020, 12(10), 3973. Rural economies face particular challenges arising from COVID-19 but have also demonstrated resilience and adaptability in previous crises. Includes list of key policy and research questions for consideration around changes in household, business and supply chain behaviours in rural areas brought on by crisis and future recovery.</li> <li>• UKRI Landscape Decisions Research Programme <u><a href="https://landscapedecisions.org/">https://landscapedecisions.org/</a></u>. Over 50 ongoing research projects all exploring the challenge of delivering better, evidence-based decisions for UK landscapes. Includes projects with a focus on developing new mathematical and modelling approaches as well as projects using arts and the humanities to generate new thinking around people's interactions with the landscape</li> <li>• Royal Society Food, Farming &amp; Countryside Commission 'Our future in the land' <u><a href="https://ffcc.co.uk/assets/downloads/FFCC-Our-Future-in-the-Land.pdf">https://ffcc.co.uk/assets/downloads/FFCC-Our-Future-in-the-Land.pdf</a></u>. The report makes fifteen recommendations for policy around healthy food systems, farming as a force for change and rural communities as a powerhouse for a fair and green economy</li> </ul>
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	<ul style="list-style-type: none"> <li>• Defra Environmental Land Management (ELM) Tests and Trials (T&amp;T) Quarterly Evidence Report, July 2020. Summary report on interim findings on ELM T&amp;T programme focusing on delivery of public good provision from agricultural land.</li> <li>• Countryside and Community Research Institute COVID-19 and sustainable food systems: a shared learning resource <a href="http://www.ccri.ac.uk/COVID-19-food-system/">http://www.ccri.ac.uk/COVID-19-food-system/</a> Excellent resource with links to blogs and papers highly relevant across number of ARIs including on theme of animal health and zoonoses</li> <li>• Reed MS, Kenter JO, Hansda R, Martin J, Curtis T, Prior S, Hay M, Saxby H, Mills L, Post J, Garrod G, Guy JA, Proctor A, Whittingham M, Collins O, Stewart G. <u><i>Social barriers and opportunities to the implementation of the England Peat Strategy : Final report</i></u>. Newcastle upon Tyne: Newcastle University, Natural England and Defra, 2020. Explores upland land management and how land managers view the barriers and opportunities to engaging with England Peatland Strategy. While money is important, the research showed that land managers are also attracted to schemes for other personal and social reasons, for example if schemes enable them to collaborate with others, contribute to their local community or engage in activities that increase their sense of personal connection to the landscapes they manage</li> <li>• Strategic Priorities Fund on Landscape Decisions: Towards a new framework for using land assets; Strategic Priorities Fund on Food Systems; Assist (UK Centre For Ecology &amp; Hydrology &amp; Rothamsted) NC programme; Soil Security Programme; Signals in the Soil Programme.</li> <li>• Industrial Strategy Challenge Fund Transforming Food Production programme</li> <li>• GFS Resilience of the UK Food System in a Global Context (GFS-FSR) programme.</li> <li>• Global Food Security Policy Lab Report "<u>Multifunctional landscapes in the UK: tools for policy and practice</u>"</li> <li>• BBSRC/Global Food Security internal report on "Building back better for increased resilience of the UK food system to future shocks" (To be published soon).</li> <li>• Nature Food comment piece by GFS-FSR Bob Doherty "<u>Vulnerability of the United Kingdom's food supply chains exposed by COVID-19</u>"</li> <li>• BBSRC/Global Food Security internal report on "Building back better for increased resilience of the UK food system to future shocks".</li> <li>• BBSRC strategically funded institutes – Rothamsted Research (The North Wkye Farm Platform, ASSIST, soils to nutrition, Insect Survey), John Innes Centre (Designing Future Wheat, Germplasm Resource Unit), The Roslin Institute (Blueprints for healthy animals, control of infectious diseases and improving animal production and welfare), The Pirbright Institute (enhanced host responses for disease control), Quadrum Institute, Earlham Institute (From genomes to food security) and Institute of Biological, Environmental and Rural Sciences (Resilient Crops)</li> <li>• Agri-tech centres</li> </ul>
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	<ul style="list-style-type: none"> <li>• BBSRC led programmes – Strategic Priorities Fund Bacterial Plant Diseases, horticulture quality and food loss network, veterinary vaccinology network, animal welfare network, networks in vector borne disease research and BBSRC veterinary vaccinology strategy</li> <li>• Defra funded Genetic Improvement Networks</li> <li>• STFC Food Network, STFC Facilities including the ISIS Neutron Source, Central Laser Facility, Diamond Light Source, Scientific Computing Department, Hartree Centre, and Rutherford Appleton Laboratory Space</li> <li>• Social, Technological and Environmental Pathways to Sustainability Centre <a href="#">biotechnology research archive</a></li> <li>• Genome Editing and Agricultural Policy, Practice and Public Perceptions (GEAP3) network</li> <li>• UKRI Landscape Decisions Research Programme <a href="https://landscapedecisions.org/">https://landscapedecisions.org/</a> Over 50 ongoing research projects all exploring the challenge of delivering better, evidence-based decisions for UK landscapes. Includes projects with a focus on developing new mathematical and modelling approaches as well as projects using arts and the humanities to generate new thinking around people’s interactions with the landscape</li> <li>• Royal Society Food, Farming &amp; Countryside Commission ‘Our future in the land’ <a href="https://ffcc.co.uk/assets/downloads/FFCC-Our-Future-in-the-Land.pdf">https://ffcc.co.uk/assets/downloads/FFCC-Our-Future-in-the-Land.pdf</a> The report makes fifteen recommendations for policy around healthy food systems, farming as a force for change and rural communities as a powerhouse for a fair and green economy</li> <li>• The EAT-Lancet Commission on Food, Planet, Health <a href="https://eatforum.org/eat-lancet-commission/">https://eatforum.org/eat-lancet-commission/</a></li> <li>• City University, London Centre for Food Policy - <a href="https://www.city.ac.uk/about/schools/health-sciences/research/centre-for-food-policy">https://www.city.ac.uk/about/schools/health-sciences/research/centre-for-food-policy</a></li> </ul> <p><b>Other ongoing work to be aware of:</b></p> <ul style="list-style-type: none"> <li>• Agrifood hub <a href="https://www.n8agrifood.ac.uk">https://www.n8agrifood.ac.uk</a></li> <li>• Reduction of food waste across the supply chain and in primary production / on farms. See e.g. POSTBrief - Food Waste in the Food System (forthcoming) and e.g. Bojana Bajželj and others, ‘The Role of Reducing Food Waste for Resilient Food Systems’ (2020) 45 Ecosystem Services 101140. See also Benton and Bailey (above) on the relationship between agricultural productivity and food waste. For critique of government policy on food waste see Bradshaw, ‘England’s Fresh Approach to Food Waste: Problem Frames in the <i>Resources and Waste Strategy</i>’ (2020) 40(2) Legal Studies 321; Bradshaw, ‘Waste Law and the Value of Food’ (2018) 30 Journal of Environmental Law 311, arguing that food waste has been problematically framed in waste law and policy as a waste problem rather than a resource problem, in turn obscuring food’s agricultural origins and productive context.</li> </ul>
How can management of	<ul style="list-style-type: none"> <li>• NERC supported Urgency Grants and Highlight topic ideas.</li> <li>• NERC COVID-19 workshops</li> </ul>

<p>the UK's land use footprint in other countries reduce likelihood of zoonotic disease emergence along with improved sustainability outcomes?</p>	<ul style="list-style-type: none"> <li>• UKRI Awards under the <u>COVID-19 Rapid Response</u> scheme</li> <li>• BBSRC, ESRC, MRC, NERC, FCDO and Defence Science and Technology Laboratory funded: Zoonoses and emerging livestock systems (ZELS)</li> <li>• STFC Rutherford Appleton Laboratory Space Date Centre</li> <li>• Defra Environmental Land Management (ELM) Tests and Trials (T&amp;T) Quarterly Evidence Report, July 2020 Summary report on interim findings on ELM T&amp;T programme focusing on delivery of public good provision from agricultural land</li> </ul>
<p>How can we deliver early warning systems to monitor signals in the environment relevant to public health and other societal outcomes?</p>	<ul style="list-style-type: none"> <li>• Signals in the soil Programme,</li> <li>• UK Centre For Ecology &amp; Hydrology land cover maps and Water resource portal</li> <li>• NERC digital Environment programme.</li> <li>• Awards under the <u>COVID-19 Rapid Response</u> scheme, including projects around COVID-19 in wastewater.</li> <li>• UK Animal and Plant Health strategy has a focus on early rapid detection</li> <li>• BBSRC Transformative Research Technologies highlight – Animal and Plant Disease</li> <li>• Industrial Strategy Challenge Fund – Transforming Food Production</li> <li>• FeedUK</li> <li>• Countryside and Community Research Institute COVID-19 and sustainable food systems: a shared learning resource <a href="http://www.ccri.ac.uk/COVID-19-food-system/">http://www.ccri.ac.uk/COVID-19-food-system/</a> Excellent resource with links to blogs and papers highly relevant across number of ARIs including on theme of animal health and zoonoses</li> </ul>
<p>How can we deliver a coherent spatial strategy that balances and optimises land use between different areas of the UK?</p>	<ul style="list-style-type: none"> <li>• Royal Academy of Engineering: <u>Sustainable Living Spaces</u></li> <li>• Royal Society work on <u>environment and human health</u></li> <li>• Centre for Ageing Better interest in housing design, involvement in Home of 2030 competition and <u>accessible</u> housing options and Centre for Ageing Better work on social infrastructure</li> <li>• <u>Centre for Hydrology and Ecology</u> Catharine Ward Thompson: These have excellent models relevant to modelling current and future land use – Stefan Reis is a good contact there</li> <li>• Natural England <u>rapid review of health and wellbeing benefits for Framework of Green Infrastructure Standards</u></li> <li>• Greenspace Scotland work on using parks and greenspace as generators of green energy – <u>ParkPower</u></li> <li>• BBSRC/Global Food Security internal report on “Building back better for increased resilience of the UK food system to future shocks”. (no programme delivers both the breadth and specificity of this ARI. However, the SPF on Landscape Decisions: Towards a new framework for using land assets seeks to address the conceptual requirements of a framework to address such questions</li> <li>• No programme delivers both the breadth and specificity of this ARI. However, the Strategic Priorities Fund on Landscape Decisions: Towards a new framework for using land assets seeks to address the conceptual requirements of a framework to address such questions</li> <li>• Reed MS, Kenter JO, Hansda R, Martin J, Curtis T, Prior S, Hay M, Saxby H, Mills L, Post J, Garrod G, Guy JA, Proctor A,</li> </ul>

	<p>Whittingham M, Collins O, Stewart G. <u><i>Social barriers and opportunities to the implementation of the England Peat Strategy : Final report.</i></u> Newcastle upon Tyne: Newcastle University, Natural England and Defra, 2020 Explores upland land management and how land managers view the barriers and opportunities to engaging with England Peatland Strategy. While money is important, the research showed that land managers are also attracted to schemes for other personal and social reasons, for example if schemes enable them to collaborate with others, contribute to their local community or engage in activities that increase their sense of personal connection to the landscapes they manage</p>
<p>Land ownership, governance and finance</p>	<ul style="list-style-type: none"> <li>• <u>Natural Capital Planning Standard?</u></li> <li>• Joseph Rowntree Foundation review on <u>Climate Change and Social Justice</u></li> <li>• Scottish Land Commission <u>recommendations from taskforce on Vacant and Derelict Land</u></li> <li>• Scottish Land Commission 2019 investigation into Issues Associated with Large Scale and Concentrated Land Ownership in Scotland (Glenn et al., 2019). Large scale ownership is linked to but separate from concentrated decision-making power over land use. Suggests possible ways to reduce concentration of power over land use</li> <li>• Roberts, C., Blakeley, G., and Murphy, L. 2018. A Wealth of Difference: reforming the taxation of wealth. Institute for Public Policy Research, Discussion paper, 26. Problematizes existing taxation, with reference to land value tax and suggests alternatives.</li> <li>• A. Corlett A, 2018. Passing on: options for reforming inheritance taxation, Resolution Foundation. Problematizes existing inheritance taxation and suggests alternatives which would better serve the public interest</li> <li>• On Land Values and Concentrated Ownership:</li> <li>• Scottish Land Commission 2019 investigation into Issues Associated with Large Scale and Concentrated Land Ownership in Scotland (Glenn et al., 2019)</li> <li>• Roberts, C., Blakeley, G., and Murphy, L. 2018. A Wealth of Difference: reforming the taxation of wealth. Institute for Public Policy Research, Discussion paper, 26. Problematizes existing taxation, with reference to land value tax and suggests alternatives</li> <li>• A. Corlett A, 2018. Passing on: options for reforming inheritance taxation, Resolution Foundation Problematizes existing inheritance taxation and suggests alternatives which would better serve the public interest</li> <li>• Other ongoing work to be aware of</li> </ul> <p><b>Subtopics:</b></p> <p><b>1. Community led housing, role of community land trusts in regenerating land/assets</b></p> <ul style="list-style-type: none"> <li>• <a href="http://www.communitylandtrusts.org.uk/filecache/a34/126/197-final-ncltn-written-evidence-to-dclg-select-committee-enquiry-into-future-of-housing-associations-revised.pdf">http://www.communitylandtrusts.org.uk/filecache/a34/126/197-final-ncltn-written-evidence-to-dclg-select-committee-enquiry-into-future-of-housing-associations-revised.pdf</a></li> </ul>

	<ul style="list-style-type: none"> <li>• <a href="http://www.communitylandtrusts.org.uk/filecache/f28/204/635-final-ucltp-report.pdf">http://www.communitylandtrusts.org.uk/filecache/f28/204/635-final-ucltp-report.pdf</a></li> <li>• <a href="https://www.cafonline.org/docs/default-source/charity-finance-and-fundraising/2540aact-report-090119.pdf">https://www.cafonline.org/docs/default-source/charity-finance-and-fundraising/2540aact-report-090119.pdf</a></li> <li>• Role of cohousing - <a href="https://cohousing.org.uk/wp-content/uploads/2017/03/Cohousing-shared-futures-2016.pdf">https://cohousing.org.uk/wp-content/uploads/2017/03/Cohousing-shared-futures-2016.pdf</a></li> <li>• Grassroots innovations in housing <a href="http://eprints.whiterose.ac.uk/151251/">http://eprints.whiterose.ac.uk/151251/</a></li> <li>• Hope for housing <a href="https://www.birmingham.ac.uk/Documents/college-social-sciences/social-policy/HCRN/hope-for-housing-conference/hrc-report-06-11-18.pdf">https://www.birmingham.ac.uk/Documents/college-social-sciences/social-policy/HCRN/hope-for-housing-conference/hrc-report-06-11-18.pdf</a></li> <li>• Wealth of work by David Mullens Birmingham Uni (housing and communities research) <a href="https://www.birmingham.ac.uk/research/chasm/research/housing-communities/index.aspx">https://www.birmingham.ac.uk/research/chasm/research/housing-communities/index.aspx</a></li> </ul> <p><b>2. Land ownership</b></p> <ul style="list-style-type: none"> <li>• Work of Guy Shrubsole <a href="https://whoownsengland.org/about/">https://whoownsengland.org/about/</a></li> <li>• Shared assets <a href="https://sharedassets.org.uk">https://sharedassets.org.uk</a></li> <li>• Comprehensive land allocation plan in CAT's zero carbon Britain report <a href="https://www.cat.org.uk/info-resources/zero-carbon-britain/">https://www.cat.org.uk/info-resources/zero-carbon-britain/</a></li> </ul> <p><b>3. Land and data</b></p> <ul style="list-style-type: none"> <li>• Shared assets land explorer <a href="https://sharedassets.org.uk/innovation/land-explorer/">https://sharedassets.org.uk/innovation/land-explorer/</a></li> <li>• Leeds Open Data Institute common ground mapper <a href="https://odileeds.org/blog/2018-06-08-common-ground">https://odileeds.org/blog/2018-06-08-common-ground</a></li> </ul> <p><b>4. Municipal finance</b></p> <ul style="list-style-type: none"> <li>• Mark Davis <a href="https://baumaninstitute.leeds.ac.uk/research/financing-for-society/">https://baumaninstitute.leeds.ac.uk/research/financing-for-society/</a></li> <li>• Community shares <a href="http://communityshares.org.uk">http://communityshares.org.uk</a></li> </ul> <p><b>5. Innovations in housing and placemaking – small scale disruptive digital innovators</b></p> <ul style="list-style-type: none"> <li>• Wikihouse <a href="https://www.wikihouse.cc">https://www.wikihouse.cc</a></li> <li>• Demodev <a href="https://birmingham.impacthub.net/mission/demodev/">https://birmingham.impacthub.net/mission/demodev/</a></li> <li>• Built in common and mass bespoke <a href="https://builtincommon.org">https://builtincommon.org</a></li> <li>• We can make Bristol <a href="https://wecanmake.co.uk">https://wecanmake.co.uk</a></li> </ul> <p><b>6. Devolved issues</b></p> <ul style="list-style-type: none"> <li>• Centre For Local Economic Strategies report Northern Ireland <a href="https://cles.org.uk/publications/from-coronavirus-to-community-wealth-building-back-better-in-northern-ireland/">https://cles.org.uk/publications/from-coronavirus-to-community-wealth-building-back-better-in-northern-ireland/</a></li> <li>• Wales one planet guidance <a href="https://gov.wales/one-planet-development-practice-guidance">https://gov.wales/one-planet-development-practice-guidance</a></li> <li>• Scotland Community right to buy for sustainable development: <a href="https://www.cms-lawnow.com/ealerts/2020/05/the-community-right-to-buy-for-sustainable-development-key-points-for-landowners-and-tenants">https://www.cms-lawnow.com/ealerts/2020/05/the-community-right-to-buy-for-sustainable-development-key-points-for-landowners-and-tenants</a></li> </ul>
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