Resilience of the UK food system in a global context

BACKGROUND

The Global Food Security (GFS) Programme is pleased to announce a new 5-year interdisciplinary programme of research co-designed by BBSRC, ESRC, NERC, Defra, FSA and Scottish Government, with additional support from STFC, to address a major food security challenge: 'Resilience of the UK food system in a global context'. This programme of research is informed by the GFS Strategic Plan[1], the five challenges outlined in the Foresight report on the Future of Food and Farming[2], and the two GFS '100 questions' activities[3], which all identified strategic research priorities on the resilience aspects of food security.

The Food and Agriculture Organisation (FAO) has predicted that demand for food from a growing population will increase by 38% by 2030 and 60% by 2050.[1] In future, food supply (including production, processing and distribution) must use the same or less land and fewer inputs, produce less waste and have a lower environmental impact.

The challenge is to deliver a food system which can meet the rising demand for food in ways that are environmentally, socially and economically sustainable and provide an acceptable, safe and nutritious diet for all. This is in the face of evolving world-wide markets, global climate and demographic changes, and threats posed by pests and diseases. The challenges around increasing resilience of the food system at a national and international level are complex and interconnected, requiring joined up approaches across the food supply chain. This global challenge has clear ramifications for the UK food system as around half of the UK food supply is imported[4].

AIM

Through interdisciplinary research calls, community building, and impact activities, this programme aims to build a coherent portfolio of research across key funders which will deliver evidence for policy and industry to support a resilient UK food system. Knowledge exchange will be integrated throughout, helping to drive innovation and the translation of research into policy and practice for use by policy makers, farmers, food chain stakeholders, and civil society. There will be two complementary calls for proposals, leading to a portfolio of projects covering the breadth of the challenges. We anticipate funding a number of small and large interdisciplinary projects in each call, with the second call ensuring we have a balanced portfolio of projects covering all three areas. The duration of proposals can be between 1 and 5 years and the amount awarded in each call will be subject to the quality of applications and coverage of a balanced portfolio across the three broad themes.

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[1] www.foodsecurity.ac.uk/assets/pdfs/gfs-strategic-plan.pdf
[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/288088/11-547-future-of-food-and-farming-summary.pdf
[3] See www.tandfonline.com/doi/abs/10.3763/ijas.2010.0534#.U4c5VfldXz4 and http://link.springer.com/article/10.1007%2Fs12571-013-0294-4
[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/423616/foodpocketbook-2014report-23apr15.pdf

A coordinator will be recruited to ensure oversight of the Programme, to lead and coordinate activities, facilitate knowledge exchange between researchers and end users, build links between projects, assist in synthesising and translating research outputs and raise the external visibility of the programme. It is anticipated that the coordinator will be in post to coincide with the start of the first awards. This will enable the coordinator to maximise their time spent bringing the initial projects together and working with the community to attract high quality applications to the second call.

ANNOUNCEMENT OF OPPORTUNITY

This programme aims to support truly interdisciplinary projects so each proposal must integrate science areas from **all** of the research councils involved (BBSRC, NERC, ESRC). Research proposals taking a systems approach and addressing questions at the interface between themes are strongly encouraged, as are those in collaboration with policy, industry and other stakeholders. These elements are incorporated into the assessment criteria (Annex 2). Stakeholder participation in, co-funding of and/or in-kind contributions to funded projects is anticipated.

Thematic Priorities:

1. Optimising the productivity, resilience and sustainability of agricultural systems[5] and landscapes
2. Optimising resilience of food supply chains both locally & globally
3. Influencing food choice for health, sustainability and resilience at the individual and household level

It is anticipated that the second call of the programme will be launched in 2016 and will follow a similar model to the first call. The availability of funding for the second call will depend on the quality of applications received in the first call and the focus is likely to be modified to ensure a balanced portfolio of projects addressing the over-arching challenge of food system resilience.

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[5] This includes aquaculture but wild capture fisheries are not in scope.

SCOPE OF THE RESILIENCE OF FOOD SYSTEM PROGRAMME

The Challenge

Ensuring the resilience of the food system is essential if we are to meet the food security challenge. A growing population and changing diets is leading to increased pressure on global and local food systems, exacerbated by finite resources (water, fuel), market volatility, increasing environmental variability such as impacts of extreme weather, and emerging plant and animal pests and diseases.

Growing demand can be met in part by 'Sustainable Intensification' (SI)[6], i.e. sustainably increasing production, whilst ensuring improved resource use efficiency and better environmental outcomes. There are a range of innovative approaches that could help achieve this and these should be assessed responsibly. The need however goes beyond sustainable intensification and involves maintaining the range of ecosystem services including food production at the landscape level to ensure sustainable, resilient and productive food systems, including the mitigation of risk in these systems.

Climate change, water scarcity, rising energy prices and market volatility will add further pressure to the food system. This may lead to unpredictable, rapid and very large disruptions to global and UK food production and supply, which may be devastating for populations far removed from the site of the original shock. With growing pressure on food supply chains, actions need to be taken to ensure food remains safe and affordable and consumer trust in the food chain is maintained.

In a world increasingly under pressure, consumer expectations of plentiful, cheap and year-round food do not always align with positive outcomes for health and sustainability. There is a growing need to understand interactions between drivers, policy interventions, values, trade-offs, behaviours and consumption practices across different actors including the food industry, households and communities. Innovations and better choices are required both in production and consumption in order to significantly relieve pressure on global food systems and to combat the rising incidence of non-communicable diet-related diseases such as obesity and diabetes. Resilience is not a single challenge, and may look different under contrasting viewpoints, with different framings. Engagement with industry and understanding of private sector practices will inform the development of new tools and interventions, and will help in understanding the drivers of market economics.

This interdisciplinary research programme will provide the evidence base to underpin the UK's strategic approach to food security and create a more resource efficient and resilient food system in a changing world. It will inform how we monitor, manage and mitigate short and long-term risks to resilience of the food system and provide tools and interventions for increased stability.

(Working definitions of resilience and sustainable intensification are provided at Annex 1)

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[6] Sustainable Intensification in Agriculture: Premises and Policies, Science Vol. 341 no. 6141 pp. 33-34 (Garnett et al, 2013) http://www.sciencemag.org/content/341/6141/33.summary

Call Thematic Priorities

There are three interlinked thematic priorities in this call (Pic 1). Proposals that address aspects of more than one theme are strongly encouraged.

Picture 1: The programme's interlinked thematic priorities

1. Optimising the productivity, resilience and sustainability of agricultural systems and landscapes

Interdisciplinary challenges

Sustainable Intensification (SI) will be essential to feed a growing population in a sustainable way, whilst delivering improved environmental, social and economic outcomes in a way that ensures public confidence. This theme addresses how to ensure productive agricultural systems and landscapes that are sustainable *and* resilient.

Understanding what SI can achieve under different conditions and against different pressures, how SI practices can be implemented and how it could contribute to ensuring a resilient food system will be a significant part of this challenge. At a landscape scale, this requires ensuring that production of food sits alongside production of other valued ecosystem services (e.g. provision of water, flood defence, protection of biodiversity and the cultural value of the landscape). Addressing SI therefore requires balancing production with maintenance of the natural capital on which it and other ecosystem services depend and optimising trade-offs. As SI is a multi-faceted approach, the desired outcome will likely be

achieved through different practices at different scales. A number of existing initiatives[7] will complement this theme.

The core of this theme is to understand the relationship between resilience, sustainability and production and how to optimise the trade-offs associated with these. Delivering agricultural systems and landscapes that balance the provision of food with other ecosystem services ("sustainable, resilient, intensification") in the face of evolving world-wide changes and threats is also key.

This theme may incorporate topics including but not limited to the following:

- A systems approach that takes multiple perspectives (e.g. disciplines, food chain actors, consumers, rural inhabitants) and integrates our understanding of the biological systems, behaviours, the environment and the threats facing our food supply at a range of spatial and temporal scales.
- Integrating genotype, phenotype management and environment in crop and livestock systems.
- Development of sustainability and resilience metrics, including outcome-based metrics that will provide multidimensional resilience at appropriate spatial and temporal scales.
- Identifying prospects and implications around potentially transformative social and technological innovations (e.g. alternative rural enterprises and food systems) to enhance the resilience of our food supply systems.
- Understanding the drivers of vulnerability and adapting to them to build greater resilience and sustainability into agricultural systems so that they are better able to withstand external threats (such as plant and animal pests and diseases, extreme weather).

Anticipated Outcomes:
- Understanding how to deliver sustainable intensification of agricultural systems and landscapes which are resilient to pressures (e.g. weather, input volatility, pests and diseases), optimise trade-offs, and meet supply chain and consumer needs
- Farming systems that are managed as part of the wider landscape and link genotype, phenotype and environment to enhance agricultural practices and environmental outcomes
- Sustainably increasing yields with improved environmental outcomes, plant or animal health & welfare and product quality through understanding of interactions between farmed and other (pathogenic, competitive or beneficial) organisms and how these may vary through time
- New interdisciplinary modelling and surveillance, to provide resilience benchmarks in response to climate and extreme weather events, new and emerging pests and disease threats (including windborne and insect borne pathogens), economic shocks and other pressures on the food system
- Improved understanding of host/pathogen interactions to inform the development of improved control tools (vaccines/diagnostics)
- Ways to translate knowledge and implement sustainable intensification practices across agricultural systems and landscapes including encouraging farmers to

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[7] Eg. Sustainable Agriculture Research & Innovation Club, Understanding the Challenges of the Food System, Defra UK Sustainable Intensification Platform, the Centre for Agri-Informatics and the EU Framework programmes

collaborate in delivering ecosystem services, understanding the trade-offs required and maintaining natural capital.

- Development of decision support tools for farmers to identify and better manage trade-offs between increasing productivity, sustainability and delivering environmental benefits at the farm scale
- A robust evidence base to inform policy development and infrastructure to ensure a resilient food system
- A coherent approach on research to complement existing initiatives relevant to sustainable intensification.

2. Optimising resilience of food supply chains locally and globally

Interdisciplinary challenges

As the world becomes more interconnected, the climate increasingly variable and the competition for resources increases, the shocks and challenges faced by the international food supply system will intensify. For a resilient supply chain to be achieved, consideration must be given to economic, environmental, biological and social factors and the interplay between these and supply chain governance at local-to-global levels. Factors impacting on resilience include climate change, extreme weather events, and both ecosystem services and disservices (the latter including threats from new plant and animal pests and diseases). This is set against the context of their impact on food supply through trade barriers and reductions in yield, and socio-cultural events (civil unrest, political disruptions) that impact on international trade and equity. The key challenge is to ensure food market resilience.

This theme may incorporate topics including but not limited to the following:

- Understanding the effects, risks and uncertainties associated with UK imports from areas with increasing pressure on local natural resources (e.g. biodiversity, land and water), alongside equity & security in producer countries as climate and demand changes.
- Innovative approaches to integrate and accurately forecast supply and demand, weather, plant and animal disease threats over the short and long term.
- Sustaining production in an area where risks from alternative sourcing are increasing and identifying the costs and benefits of different options to the supply chains, local environments and communities.
- Understanding how to ensure food safety and integrity across international supply chains as demand grows and resources become scarce in order to prevent food fraud, conflicts and political tensions, and protect consumers. It is expected that this area will build on previous relevant calls[8].
- Analysing the impacts of trade policies (taxation and subsidies) and market destinations on the resilience of the food system.
- Considering issues around the greater haulage costs for many commodities and high profile products in relation to meeting consumer demands.

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[8] ESRC and FSA call on Understanding the challenges of the Food System

- Understanding the biological, environmental and socio-economic approaches to increasing resilience of agriculture to threats such as plant and animal pests and diseases, extreme weather and/or natural hazards (e.g. climate-resilient agriculture).
- Developing innovative approaches to better manage over production through improved storage, processing or redistribution of surplus food.
- Integration of long-term economic and climate/yield models to increase our understanding of the relationship between system shocks (e.g. weather events. geopolitical or social events, pests and disease outbreaks) and price variability in the longer term, whilst factoring in wider societal priorities.

Anticipated Outcomes:

- Holistic evidence on the impact of potential environmental, biological or economic shocks to UK food supply which is translated into policy and practice.
- Tools to inform risk management and mitigation options, whilst ensuring qualities of equity and security for producer countries.
- New integrated models to: forecast supply (i.e. yields under various weather, pests and diseases pressures) and demand (influenced by economics, socio-cultural events); aid our understanding of supply chain vulnerabilities; identify and assess risks to the food system in the short and long term; inform policy and business responses.
- New strategies and techniques to help policy makers, farmers, and food chain stakeholders combat/mitigate the effects of external pressures on agricultural yield and broader ecosystem services
- Support farmers through knowledge exchange and policy implementation in delivering sustainable products and overcoming potential conflicts with commercial drivers.
- Tools and approaches to better predict detect and minimise food fraud to increase integrity of UK food supply and ensure consumer confidence in food.
- Facilitating resilience across borders by sharing best practice with developing countries to influence consumer and stakeholder behaviour to enhance resilience and biosecurity.

3. **Influencing food choice for health, sustainability and resilience at the individual and household level**

Interdisciplinary challenges

The food sector works to meet demand, but equally there is a consumer expectation that demand should always be met. However, if the supply chain is not sufficiently resilient (themes 1 and 2), demand for produce in the UK might not be met when the system comes under pressure. Innovations are therefore required on the demand-side, as well as the supply-side, in order to significantly relieve pressure on global food systems (including in consumption, waste generation, water and energy use). Business enterprises and the impacts of their strategic choices play a central role in influencing demand, which needs to be met whilst ensuring the provision of nutritious, safe and sustainable food in more resilient and equitable ways.

Consumption patterns are increasingly moving towards resource intensive diets that contain more sugar, salt and fat. These diets are associated with rapid rising incidence of non-communicable diet-related diseases such as obesity and diabetes. Research is therefore needed to understand the interactions between drivers and impacts of food choices, how these affect sustainable food production and health, and the trade-offs and tensions involved. Research in this area could be reinforced by greater consideration of the balance of responsibility between producers and consumers (e.g. in offsetting measures to reduce waste) and how this impacts food system resilience. Equally important is the identification of interventions that might lead to improved outcomes for health and sustainability. For example, radical shifts in dietary preferences may call for significantly different ways of producing food that may impact on the resilience and sustainability of production systems, and vice versa. Understanding the dynamics, trade-offs and tensions between production, demand and supply is therefore crucial for the whole food system.

This theme may incorporate topics including but not limited to the following:

- Understanding the impact of increasing demand for resource-intensive food and high salt and sugar foods on natural capital.
- Investigating how interventions in farming, food industry practices and purchasing patterns contribute to localised changes in communities (e.g. impact of retail pricing demands on local farms, land use and urban agriculture), affecting what is produced and where.
- Integration of business management and industry studies with the development of new research, and targeted research applicability to the real world.
- Understanding, whether and how education and communication across all age groups aligns with food system resilience, improved sustainability and nutritional outcomes in the longer term. If sustainable nutrition became a policy goal, what might influence consumption decisions and how might agriculture, business and policy makers respond?
- Understanding how consumers are driven or constrained by a confluence of factors (e.g. systems of provision, manufacturers' activities, public confidence, market intervention, pricing and branding, sustainability or health claims, and cognitive factors, such as the gut-to-brain axis, food-reward mechanisms and temptation) and how behaviours might be changed to encourage healthy and sustainable living.
- Understanding what types of interventions will most effectively lead to behaviour changes and smarter decision-making across food supply chains from producers to consumers.
- Investigating the effects of flexible supply agreements, where opportunist dealing can create an adversarial, inefficient and dysfunctional supply chain.

Anticipated Outcomes

- Evidence that links food choices, production systems, and health and environmental outcomes, identifying particular pressure points across the whole food system and where interventions might be best targeted.
- Information and tools to help individuals and households make better choices for health and sustainability.

- Obtaining a better understanding of how consumer attitudes affect food supply and can influence food industry practices to increase resilience.
- Tools to influence the behaviour of food chain actors to help move the food system towards improved health and environmental outcomes, and mitigation of potential risks.
- Holistic evidence and communication of the implications for policy-makers and industry on positive interventions to help facilitate a food system that delivers for both health and sustainability

MAXIMISING IMPACT FROM THE RESILIENCE PROGRAMME

In order to ensure the GFS Food System Resilience Programme delivers excellence with impact, a set of mechanisms have been developed to enable translation of research into policy and practice and delivery of economic and societal benefit. A significant proportion of post-doc time and a small amount of PI time would need to be allocated to being part of the centre of expertise, working with the coordinator, attending stakeholder workshops / dissemination events and networking with the user community:

- All proposals are expected to articulate within the 'Pathways to Impact' statements (see Annex 3 for more detail) what mechanisms they would put in place to ensure stakeholders are involved throughout the research process. It is important to ensure that stakeholders are not just involved at the start and at the end of a project, but throughout.

- Collaborative research grants with stakeholders are strongly encouraged. Cash or in-kind contributions are anticipated from external collaborators on grants (though not mandatory so early stage research can also be supported). The assessment panel will take a judgment on the nature and strength of collaborations and this will be reflected in the score for economic and social impact, and policy/industry relevance. External collaborators may include, but would not be limited to, industry, charities and NGOs. As an example, an in-kind contribution from a charity could include attaching a financial value to one of their employee's time on a project.

- Proposals may incorporate placement opportunities for post-docs and stakeholders to spend time at each other's organisations to translate the knowledge emerging from projects and to ensure research is based on user needs. This would provide invaluable experience for the people involved in the interchange, shape research to meet the needs of the user community, and ensure users have access to the latest evidence. Post-doc time would already be included in the grants but travel and accommodation costs could also be accounted for; stakeholder time would be an 'in-kind' contribution through a secondment, as would their travel and accommodation costs. The time spent at each other's organisations would be as appropriate to the project and would not always require interchange both ways. Costs for post-docs can only be included where a placement has been agreed in principle with a particular stakeholder.

- A coordinator will be recruited to ensure coordination and collaboration across the grants supported by this programme, but also across other relevant investments, as well as knowledge exchange with key stakeholders such as policy and industry to drive impact. Activities led by the coordinator, with input from grant holders and post-docs, will include:

  o a 'centre of expertise' across grant-holders and post-docs (as described below)
  o policy and practice notes (single project and cross-project synthesis reports)
  o stakeholder workshops / dissemination events
  o integration with and use of existing networks (including the network of coordinators)
  o KE fund for ad-hoc KE activities
  o regular progress updates for funders and early notice of new papers emerging from projects

- The virtual 'centre of expertise' will be run by the coordinator and will consist of investigators and post-docs from grants funded under the programme as a condition of award. This virtual centre would provide a network of leading academics in the area of food security who could be called upon to provide academic expertise to policy-makers when it is needed (the coordinator would manage requests to ensure the time commitment is not onerous). This will enable academics to maximise opportunities for their research to deliver impact, especially with the incorporation of impact into the REF.

ANNEX 1

DEFINITIONS

Resilience refers broadly to a system's (physical, biological or social) ability to withstand external perturbations and return to its original state. Measures to increase resilience might include buffering against the primary and secondary effects of shocks, reducing the time taken for the system to return to its original state, or maintaining stability in the event that a permanent transformation occurs.

Sustainable intensification (SI) encompasses sustainably increasing the production of food, combined with improved resource use efficiency and better environmental outcomes. Delivering SI will require balancing yield and optimising inevitable trade-offs with maintenance of the natural capital necessary for the provision of other ecosystem services - as distinct from increasing yield *per se* or just producing "more from less". The notion of SI therefore implicitly requires balancing production against its impacts on different aspects of the economic, social and biophysical environments to maintain the natural capital necessary for the provision of other ecosystem services. Working out how to judge this balance, and who judges this balance is a research question. In some places, SI may not be about "growing more", but growing produce less intensively to mitigate other impacts. Social sustainability is a key component of SI and at the farm scale revolves around the people within that enterprise, but also the broader rural environment in terms of effects on public good ecosystem services in the landscape (including rural and urban links), ethical or welfare implications, and public acceptance.[9]

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life, in ways the planet can sustain into the future.[10]

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[9] Taken from the BBSRC Sustainable Intensification Working Group report
http://www.bbsrc.ac.uk/web/FILES/Reviews/1409-sustainableagriculture-workinggroupreport.pdf
[10] Taken from the FAO definition http://www.fao.org/forestry/13128-0e6f36f27e0091055bec28ebe830f46b3.pdf

ANNEX 2

GUIDELINES FOR APPLICANTS

The objectives of the proposed research must fit the Call's thematic priorities. This call seeks to support truly interdisciplinary projects so each proposal must integrate science areas from **all** of the research councils involved (BBSRC, NERC, ESRC). Research proposals taking a systems approach and addressing questions at the interface between themes are strongly encouraged.

It is likely that the aims of this programme might best be achieved by collaboration with end-users. Therefore, collaborative projects which bring together stakeholder groups from industry, policy and other relevant sectors to move research closer to application are strongly encouraged. This call will support grants from 1 up to 5 years duration, costing up to £2.8M this represents the 80% contribution to the FEC. Please see the FAQ document for more detail.

STFC Optional Funding

In addition to the funding outlined above, STFC will consider funding components of projects that could make use of [STFC facilities](#), on a case-by-case basis. It is anticipated that support includes but will not necessarily be limited to:

- HPC: modelling and optimising
- Facilities: researching processes and materials
- Remote and in-situ sensing: data, platforms, technologies
- Robotics and autonomous systems

For further information please contact:

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Exploitation and Impact

All outcomes should be managed with respect to the [RCUK Position on Impact through Knowledge Exchange](#). It is strongly advised that the basis of collaboration between the partner organisations, including ownership of intellectual property and rights to exploitation, is set out in a formal Collaboration Agreement. It is the responsibility of the lead RO to ensure an appropriate agreement is in place before the research begins, and their Technology Transfer Office (TTO) should be consulted with regards to what is required. The terms of collaboration agreements must not conflict with the Research Councils' terms and conditions.

ANNEX 2

Data Management Plans

Effective data management and adherence to standard [RCUK data policies](#) are central to the aims of the programme. The award holders will be expected to work with the Coordinating Team to ensure data are effectively managed. For more detail on how to complete this section please see [Annex 3](#).

Ethics

The Research Organisation is responsible for ensuring that ethical issues relating to the project are identified and brought to the attention of the relevant approval or regulatory body. Approval to undertake the research must be granted before any work requiring approval begins.

Ethical issues should be interpreted broadly and may encompass, among other things, relevant codes of practice, the involvement of human participants, tissue or data in research, the use of animals, research that may result in damage to the environment and the use of sensitive economic, social or personal data. For full guidance please refer to [NERC's Ethics Policy](#), [ESRC's Ethics Framework](#) and the [BBSRC Grants Guide](#).

Eligibility

Standard RCUK eligibility rules for BBSRC, NERC and ESRC apply to this call. For further information on eligible Independent Research Organisations visit: http://www.rcuk.ac.uk/funding/eligibilityforrcs/. Main research Providers (MRPs) to the Scottish Government and Defra agencies are not eligible to apply for funding from this call, however, they can be named as project partners or could be subcontracted for aspects of the work, please see the FAQ document for further details.

How to apply

Proposals must be submitted in an electronic form using the Je-S system. Applicants should select the following from the Je-S menus:

1. **Log in** the [Joint Electronic System (Je-S)](#)
2. Select **Council**: BBSRC
3. Select **Document Type**: *Standard Proposal*
4. Select **Scheme**: *Standard*
5. Select **Call/Type/Mode**: 2015 Food Systems Resilience Development
6. Click **Create Document**

For further guidance on 'How to apply' please see [Annex 3](#) and visit:
Logging into [Je-s](#)
See our full [terms and conditions](#) on the RCUK website.

Criteria for Assessment

Proposals will be assessed against the following criteria:

- **Scientific excellence**
  The extent to which the proposal meets the highest international standards of current research in its field. High performance against this factor will indicate a project of the

highest standard, competitive with the best activity anywhere in the world, demonstrating originality and innovative potential.

- **Integration of disciplines**
  The extent to which the proposal integrates science areas from **all** of the research councils involved (BBSRC, NERC, ESRC) to address one or more of the outlined programme key themes.

- **A food systems approach**
  The extent to which the proposal takes a holistic view across the whole food system, spanning aspects of all three programme themes.

- **Industry and policy relevance**
  The extent to which the research is relevant to the evidence needs of industry and/or policy and hence the potential for impact. This includes plans to enhance the impact of the research through active collaboration with relevant stakeholder groups.

- **Economic and social impact**
  The extent to which the output of the research will contribute knowledge that shows direct potential for economic return or societal benefits to the UK.

- **Timeliness and promise**
  The extent to which the proposal is particularly appropriate at the present time, or offers longer-term benefits over and above the direct value of the research.

- **Value for money**
  The extent to which the resources requested, relative to the anticipated scientific gains, represent an attractive investment for the programme funders.

Contact
Please use the programme's generic mailbox: FoodSystemResilience@foodsecurity.ac.uk

BBSRC Delivery contact
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Peer Review Officer, Delivery Unit
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ANNEX 3

HOW TO APPLY FURTHER GUIDANCE

Apply using the Je-S website (see external links) by **16:00 on 27 October 2015**. To ensure a proposal is submitted on time we suggest that it should be sent to your institution's Je-S submitter pool approximately a week before this deadline. **Please note that we are unable to accept late submissions**.

In order to see the 15FSRD call in Je-S, select the following options from the drop-down menus:
- Council: BBSRC
- Document Type: Standard Proposal
- Scheme: Standard
- Call: 2015 Food Systems Resilience Development

General guidance

- Standard guidelines for research grant applications apply, as described in our grants guide (see related links).
- Joint Research Projects: when the application involves work at more than one eligible institution, funding for a Joint Research Project may be requested by either submitting one joint application from the lead institution or by completing separate Je-S applications from each institution (see paragraphs 4.29 to 4.31 & 4.47 of the [Research Grants Guide](#)).
- Standard font (size: 11 point - we recommend the use of Arial, Helvetica or Verdana typeface) and margin sizes (not less than 2 cm) **must** be used for all forms and CVs (excluding text on diagrams and the use of mathematical symbols). A minimum of single line spacing and standard character spacing must be used. Applications that do not adhere to these guidelines may be withdrawn from consideration.
- We recommend that where a document contains any non-standard fonts (scientific notation, diagrams, etc.), the document is converted to PDF prior to attaching it to the proposal
- Students should not be included in the application
- The case for support should be a self-contained description of the proposed work with relevant background, and should not depend on additional information. Applicants must not include URLs to web resources in order to extend their case for support. However, peer reviewers are advised to not follow URL links in documents; they base their assessment only on the information contained within the form. BBSRC reserves the right to withdraw proposals that contain links to additional information that extends the case for support

Attachments

Your application should include:

	Document	Length (maximum, A4)	Number
1	Track Record and Case for Support	8 pages	1
2	Data Management Plan	1 page	1
3	Pathways to Impact	2 pages	1
4	Justification of Resources	2 pages	1
5	Diagrammatic Work Plan	1 page	1
6	CV of Principal Investigator and all Co-Investigators and named researchers	2 pages per CV	Variable

7	Letters of support (optional)	Variable	Variable
8	Final/interim grant report (where applicable, see BBSRC grants guide Section 4.15)	Variable	Variable

Guidance for completion of application documents

1. Track Record and Case for Support (a maximum of 8 sides of A4, combined)

Proposals exceeding the 8 page limit will not be accepted. Lists of references and illustrations should be included in the page limit and should not be submitted as additional documents or as an annex.

Previous research track record (suggested one to two pages). This should:

- Provide a summary of the results and conclusions of your recent work relevant to the proposed resource. It should include reference to both BBSRC/NERC/ESRC funded and non-RCUK funded work. Details of past collaborative work with industry and/or with other beneficiaries should be given.
- Indicate where your previous work has contributed to the UK's economic competitiveness or to improving the quality of life.
- Outline the specific expertise available for the research at the host organisation and that of any associated organisations.
- Relate to all applicants involved in the project.
- Preliminary data and descriptions of the work proposed in the application should be included in the Case for Support Part 2, not in the track record.

Case for support (suggested up to seven pages)

The Case for Support should be a self-contained description of the proposed resource. It should include the following:

Background

- Introduce the topic of research and explain its academic and wider context
- Demonstrate a knowledge and understanding of past and current work in the subject area both in the UK and abroad

Programme and methodology

- Identify the overall aims of the project and the individual measurable objectives against which you would wish the outcome of the work to be assessed. This should refer to the objectives set out in the proposal form (Objectives section).
- Detail the methodology to be used in pursuit of the research and justify this choice
- Explain why the proposed project is of sufficient timeliness and novelty to warrant consideration for funding
- Describe the programme of work, indicating the research to be undertaken and the milestones that can be used to measure its progress. The detail should be sufficient to indicate the programme of work for each member of the research team. Explain how the project will be managed

References should appear in a list at the end of the case for support and be linked to relevant text by, for example, sequential numbering and superscript reference numbers

embedded in the body of the document. Only one publication should be listed for each number. Within the list of references, URL links to relevant publications or online resources are permissible. The case for support should be a self-contained description of the proposed work with relevant background, and should not depend on additional information. Applicants must not include URLs to web resources in order to extend their case for support. The inclusion of such URLs could result in your application being returned for correction. Peer reviewers are advised to base their assessment solely on the information contained within the application, and instructed not to access external links.

2. Data Management Plan (maximum of 1 side of A4)

This attachment type is to be used by applicants to provide information relating to data sharing. **Submission of a Data Management Plan is mandatory.** The RCUK Data Sharing Policy can be found at http://www.rcuk.ac.uk/research/datapolicy/. The Data Management Plan should be submitted as a standalone document (not embedded in the Track Record and Case for Support) as document type "Data Management Plan". Comprehensive data management plans will be expected, in particular, in the areas highlighted in the policy:

- Data arising from high-volume experimentation
- Low throughput data arising from long time series or cumulative approaches
- Models generated using systems approaches

Data management plans may include details of:

- Data areas and data types – the volume, type and content of data that will be generated e.g. experimental measurements, records and images;
- Standards and metadata - the standards and methodologies that will be adopted for data collection and management, and why these have been selected;
- Relationship to other data available in public repositories;
- Secondary use - further intended and/or foreseeable research uses for the completed dataset(s);
- Methods for data sharing - planned mechanisms for making these data available, e.g. through deposition in existing public databases or on request, including access mechanisms where appropriate;
- Proprietary data - any restrictions on data sharing due to the need to protect
- Timeframes - timescales for public release of data;
- Format of the final dataset.

3. Pathways to Impact (maximum 2 sides of A4)

The Pathways to Impact statement must be specific to the project and contain timelines and objectives. The information in your Pathways to Impact is primarily for detailing the activities that will increase the likelihood of potential economic and societal impacts being achieved. It should continue on from the two questions addressed within your Impact Summary by addressing the following question:

- What will be done to ensure that potential beneficiaries have the opportunity to engage with this research?

Please detail how the proposed research project will be managed to engage beneficiaries* and increase the likelihood of impacts. Include timescales and required resources i.e. the cost of the activities that would be undertaken as a part of the project. Also briefly note your track record in this area.

ANNEX 3

*The Pathways to Impact attachment should outline the beneficiaries and users of the research, for example the public sector, commercial private sector, third sector or the wider public in general. Plans for engaging with academic audiences may be included, but only where these form part of the critical pathway towards economic and societal impact.

4. Justification of Resources (maximum 2 sides of A4)

All resources requested (directly incurred, directly allocated and exceptions, including PI and Co-I time) must be fully justified in the justification of resources attachment. **Please list values requested alongside the justification.** Publication costs associated with peer-reviewed journal articles and conference papers must not be included in grants as these costs are funded by RCUK APC publication funding. Publication costs other than journal articles and conference papers, such as books, monographs, critical editions, catalogues etc. that are incurred within the period of the grant may be included within directly incurred costs, but full justification must be provided.

Equipment funding must be requested in accordance with the specific guidance laid out in paragraphs 5.14 to 5.30 of the [Research Grants Guide](#). In brief, equipment up to a value of £10,000 per individual item should be included within 'Other Directly Incurred Costs' and charged at 80% FEC, whereas items over £10,000 should be requested within Directly Incurred Equipment and charged at 50% of FEC, it is then down to the research department to co-fund the remaining 50%.

5. Diagrammatic Workplan (maximum of 1 side of A4)

This attachment type is to be used by applicants to provide a diagrammatic workplan for the proposed project. Typically this is in the form of a Gantt chart. It must not be used to extend the case for support. It should be submitted as a standalone document (not embedded in the Track Record and Case for Support) as document type "Workplan".

6. CVs

- CV of the Principal Investigator, and all Co-Investigators and named researchers: up to 2 pages per CV

The CV should include details of:

- Employment history (give dates and details of position held including the nature of your current employment)
- Qualifications (state subject, class of degree with university dates)
- Patents
- Most recent publications, within the last 5 years, in refereed journals relevant to the project.
- Please note that any lists of publications should be included within the CV and not submitted as a separate document. Separate lists of publications and other unsolicited documents will not be included in the peer review process.

7. Letters of Support (optional)

Letters of support should be submitted as attachment type 'Letter of Support' with no limitation on page length. Letters of support must be included to confirm an active collaboration or contribution to a project in terms of resources or expertise, and may be included where a statement from a third party is necessary to enable the informed assessment of a proposal. Applicants are asked to note that members of an institution which

has provided a letter of support will not in general be used as referees for that proposal. Therefore, including more than a few carefully chosen letters can be detrimental to the peer review process.

Proposals which involve support from STFC facilities covered by the Optional STFC funding should be accompanied by a letter of support from the relevant STFC facility. The letter should set out the support which will be provided and the cost associated with providing this.

8. Final/Interim Reports

Principal Investigators and Co-Investigators on an application must submit an interim or final report on any related BBSRC, NERC or ESRC research grant that they have held or completed in the last twelve months (excluding those under six months old and training grants) on which they have been the Principal Investigator. The interim report should use the form on the BBSRC website (http://www.bbsrc.ac.uk/documents/grant-interim-report-doc) and the summary report section should be a maximum of two sides of A4. Submit as 'Final/Interim Report'