

Integrating impact into your case for support – example 1

ESRC Complexity Centre

Context

This is an outline stage funding proposal to ESRC to run a “Centre for evaluating complexity across the energy environment-food nexus”. As an outline proposal, there was no pathway to impact allowed, but applicants were asked to integrate the following into their case for support:

- Plans for how the Centre will approach capacity building, including its approach to user engagement and how it will facilitate a community of practice across researchers, policymakers and practitioners
- A brief outline of potential ‘quick wins’ to be achieved in the first year

Note: key names, Universities, habitats and other details have been changed in this example proposal

Objectives

Why this is the right team:

Our consortia comprises academics, policymakers, and practitioners from a wide range of different organisations (e.g. XXX). We have a leadership team of transdisciplinary researchers with a high quality record of delivering large- scale, complex, high impact projects across nexus fields in close collaboration with diverse stakeholders, and a consortium with proven expertise in evaluation, knowledge exchange and capacity building in the public, private and third sector.

Our vision:

To deliver methods and capacity to enable robust responses to environmental change across the food-energy-environment nexus that understand and manage trade-offs and exploit synergies between sectors, by empowering decision-makers from the policy, practice, third sector and business communities to advance the way new policies and practices are evaluated, developed and implemented.

How we will do this:

The Centre will draw on existing methods from multiple disciplines and areas of practice to innovate and integrate methods in the transdisciplinary space between food, energy and environment, providing novel methodological and theoretical insights in addition to practical tools, guidance and training that can be used by decision-makers. Working in close collaboration with our stakeholders, the Centre will:

1. Review, develop, test and integrate methods for evaluating complexity, considering economic and non-monetary appraisal, complex systems approaches, policy analysis and integrative evaluation frameworks, with in-depth co- exploration of these methods in four integrative policy areas of the nexus; and methods for evaluating knowledge exchange, learning and behaviour change; and
2. Apply these insights to provide strong leadership in evaluating complexity, by developing and actively promoting a methods knowledge hub across the nexus, that will champion innovative and inclusive methods, and build capacity amongst the policy, research and wider stakeholder community.

The Centre will work through six methodological work packages (WP) and across four integrative policy areas, with findings feeding into a final capacity building WP. Together, this team will address five key complexity challenges, which ask how to:

1. Manage and reconcile conflicting policy objectives across multiple sectors and governance across spatial and temporal scales (including political boundaries and levels).
2. Adapt and integrate methods to assess and value food, environment and energy enabling comparative assessment of sectors and development scenarios, recognising the complexity of potential feedbacks and multiple uncertainties (e.g. ecological, economic, political, technological, cultural, demographic)
3. Robustly assess social impacts of policies, integrate social impact assessment with existing economic and environmental evaluation, elicit and evaluate shared and plural values in relation to nexus trade-offs and synergies, and account for justice and equity concerns
4. Effectively communicate complexity, risk and uncertainty and involve stakeholders and the public in evaluating complexity
5. Consider how social networks influence the sharing of knowledge about complexity evaluation methodologies, and how decision-makers, researchers and other stakeholders can exchange knowledge and work together more effectively to enhance the uptake of different types of evaluation evidence into decisions across the nexus.

Case for Support

Rationale:

Society in the 21st Century faces a perfect storm of increasingly severe threats, from floods to droughts, climate change and biodiversity loss, security of energy supply and delivery, land degradation, pollinator extinction, food safety and obesity. It is increasingly evident that the only way to effectively address these threats to the stability and sustainable prosperity of society is to recognise their complex, interlinked nature^{1,2,3}. Although policies and other interventions are being developed around the world to mitigate or adapt to these challenges, evaluating “what works” remains problematic⁴. Partly this is due to the complexity of the (ecological, social-cultural, behavioural, economic and political) interactions that occur between environment, food and energy systems at different temporal and spatial scales. These interactions include poorly understood but potentially important feedbacks, synergies, trade-offs and thresholds, that make it difficult to predict or evaluate the outcomes of planned interventions^{5,6,7}. This includes interactions between individuals and groups with frequently divergent or competing agendas, who may perceive and react to interventions (and each other) in unpredictable ways^{8,9}. Policies can have incompatible ambitions or may be founded on competing or ill-defined discourses (e.g. ‘security’ vs. ‘sustainability’). There is thus an urgent need to develop methods that can identify and reconcile policy objectives that create conflict between sectors and interests, evaluate trade-offs (e.g. biofuels vs food production) and test opportunities for synergies and co-benefits (e.g. co-location of marine renewables with aquaculture).

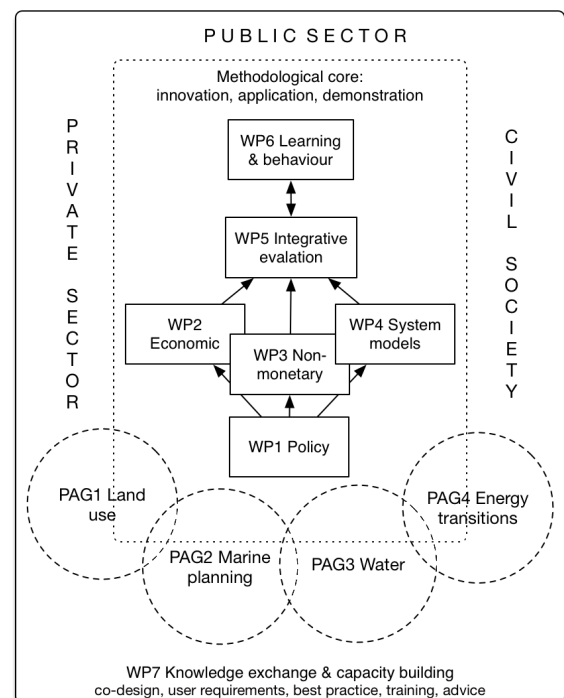
Environmental and economic impact assessments are typically applied in isolation during policy development, and methods for assessing social impacts are under-developed and under-used. This is important because policies that are likely to have environmental and economic benefits may create unanticipated trade-offs - including social impacts – that could lead indirectly to other unforeseen impacts¹⁰. Those affected by these impacts hold a plurality of values and goals of their own, and despite a growing body of theory and rhetoric, it is still a significant challenge to effectively incorporate this plurality in policy development, evaluation and implementation at relevant scales^{6,11}. Innovative and integrated methods are needed to reconcile such complex issues and provide decision-makers with tools to evaluate the potential impacts of interventions across the food-energy-environment nexus. Rather than simply developing ‘more’ and ‘better’ tools for evaluating complexity, it is crucial to understand how knowledge from decision-makers, researchers and stakeholders can be combined to co-develop, learn about and apply these tools through novel institutional and policy mechanisms¹².

Vision and approach:

Our vision is to develop highly robust responses to environmental change across the food-energy-environment nexus that avoid trade-offs and exploit synergies between sectors, by empowering decision-makers from the policy, practice, third sector and business communities to change the way new policies and practices are evaluated, developed and implemented. To achieve this vision, the “objectives” section of our application describes how the Centre will pursue two core aims in close collaboration with stakeholders, working through six methodological work packages (WPs) and building capacity across four integrative nexus policy areas (Fig. 1). Together, this work will address five key complexity challenges (see “objectives” section).

In each PAG, case studies will be identified (in collaboration with funders and stakeholders) and explored in depth, to develop and test methods in live policy situations, with a focus on methods relevant beyond the specific cases. Each PAG will include a secondment. The WPs and PAGs will interact through dialogic exchange, with WPs acting as a resource on which the PAGs can draw, and PAGs offering opportunities to test and refine methods emerging from WPs. WPs 1-4 emphasise methods, linked by WP5, which develops

Fig. 1



pluralistic, pragmatic and integrative frameworks for evaluation. These WPs feed into WP6, which focuses on methods for evaluating knowledge exchange, learning and behaviour change, and WP7 draws on all WPs and PAGs to create a resource hub and programme to build capacity for complexity evaluation. Each WP and PAGs includes a provisional list of experts and practitioners, drawing in expertise from a wide range of cognate fields.

Work Programme:

Policy areas:

PAG1: Land-use policy

Lead: XXX; **Working group members:** XXX. **Description:** This group will focus on the challenge of identifying land available to meet nexus objectives in the light of changing external drivers such as globalisation, dietary transitions, low carbon energy transitions and climate change. It will explore tensions such as maintaining food production and safety whilst moving towards low carbon energy and protecting biodiversity (including wild pollinator species). These tensions will be explored in the context of policies that cut across the nexus (e.g. Land Use Strategy for Scotland, Well-Being of Future Generations Bill in Wales, the National Planning Policy Framework in England, Marine Spatial Planning (with PAG2), Water Framework Directive (with PAG3) and energy policy (with PAG4)), to explore methods for evaluating specific policy trade-offs over space and time. **Quick wins:** development of spatially explicit tools for assessing where particular types of land use change might be beneficial or detrimental to low carbon transition pathways and achieving climate change mitigation/adaptation and food security policy goals.

PAG2: Marine planning

Lead: XXX **Working group members:** XXX. **Description:** This group will focus on potential conflicts between policy objectives in renewables, aquaculture, fishing and biodiversity, including healthy, safe and secure food chains in the context of major marine energy expansion and conservation challenges. Whilst the rapid development of marine planning is proclaimed as a means to address these conflicts and achieve optimised sustainable use of marine resources (notably via the EU Marine Spatial Planning Directive), there is an absence of cross-sectoral evaluation tools and integrative assessment approaches to inform and evaluate planning options. Key questions that will be investigated include how to evaluate policy objectives against the ecological and social carrying capacity of coastal and marine areas, how to comparatively assess environmental and social impacts, and how to evaluate complexity in international nexus cases (e.g. the Dogger Bank) amidst multiple and potentially conflicting sector development policy and trans-jurisdictional governance arrangements. **Quick wins:** Developing a framework for integrating complexity evaluation tools into governance approaches including current efforts at cross-sectoral, regional spatial planning.

PAG3: Water

Lead: XXX; **Working group members:** XXX. **Description:** This group will explore nexus challenges to systemic water management, considering trade-offs between water, energy, food and wider environmental policies. Policy objectives relating to flood risk management, climate change adaptation, agricultural water use, fisheries, hydro and tidal energy generation and water quality have often been considered and managed for separately, even though they clearly affect each other. Without more explicitly considering links between these interconnected policy areas, there is a danger that tradeoffs will be poorly handled. We will tackle this challenge by reviewing and connecting apparently disconnected and disparate intervention cases across the world to inform novel evaluation approaches, drawing on resource-specific examples of integrated catchment management in collaboration with PAGs 1 & 2. **Quick wins:** Institutional analysis to identify opportunities for more integrated evaluation of catchment and coastal management policies and interventions, scoping different tools and techniques for more systemic and cross-sectoral approaches.

PAG4: Energy transitions

Lead: XXX; **Working group members:** XXX. **Description:** This group will focus on the challenges of evaluating low carbon transition pathways in the energy and agricultural sectors whilst avoiding trade-offs with food and the natural environment. Different policy choices lead to different pathways for addressing the dilemma of meeting carbon reduction targets whilst maintaining secure and affordable food and energy. This requires understanding of how policy choices interact with technological and behavioural choices to give rise to emergent energy pathways, and appraisal of economic impacts (e.g. energy

investment costs and agricultural production costs), environmental impacts (e.g. local air pollution and “green-on-green” impacts of wind farms on raptors), and social impacts (e.g. changes in levels of fuel poverty or reduced self-sufficiency in food due to biofuel cropping), of these pathways. This work will examine how complexity methods can be used to appraise these impacts and examine the resulting trade-offs. **Quick wins:** Complexity based evaluation of the impacts of different energy investment decisions on the energy and agricultural sectors.

Methods Work Packages:

WP1: Policy analysis

Lead: XXX; **Working group members:** XXX. **Description:** WP1 will investigate methods that can evaluate relations between policies (e.g. rapid policy network analysis), frameworks for understanding policy conflicts and institutional barriers across the nexus and across governance levels, identifying approaches to address these issues. It will consider multi-level governance interactions from local to international, the challenge of different motivations, constraints, metrics and outcomes across different policy areas, and how this results in ‘winners’ and ‘losers’ and will advance pathways that could overcome current policy and governance limitations that hinder effective complexity evaluation. **Quick wins:** SWOT analysis of current policy evaluation frameworks and guidelines methods in light of complexity evaluation; overview of clashes across policy.

WP2: Economic appraisal methods

Lead: XXX; **Working group members:** XXX. **Description:** Development and testing of methods that link economic appraisal to whole systems approaches, better integrate uncertainty and risk analysis, exemplify cross-sectoral approaches, and integrate economic and deliberative evaluation (considering issues such as synergies and trade-offs, uncertainty, rights and equity, the aggregation problem, discounting). This WP will include a wide range of micro- and macroeconomic assessment methods, including cost-benefit analysis, a range of social impact analysis approaches and quantitative modelling techniques, and deliberative monetary valuation. **Quick wins:** SWOT analysis of current micro-and macroeconomic tools in light of complexity and uncertainty evaluation; Integration of basic risk analysis tools (e.g. signal detection theory approaches) into CBA.

WP3: Non-monetary evaluation methods

Lead: XXX; **Working group members:** XXX. **Description:** Development and testing of a wide range of qualitative and participatory evaluative techniques (e.g. multicriteria approaches, participatory scenario development, citizens’ juries, mapping approaches, subjective well-being approaches, community voice method) to better incorporate whole-systems perspectives and deal with complexity and uncertainty. **Quick wins:** SWOT analysis of current tools in light of complexity evaluation.

WP4: Complex systems analysis

Lead: XXX; **Working group members:** XXX. **Description:** This WP will assess the potential for complex systems modelling approaches to build understanding of environmental processes into the evaluation of policies and interventions. It will review a wide range of both ‘hard’/quantitative (e.g. Ecopath) and ‘soft’/conceptual/deliberative (e.g. Bayesian belief or agent-based models) systems analysis methods for understanding social-ecological system dynamics in response to drivers across the nexus. It will then select a combination of these approaches to develop a nexus landscape typology that can provide decision-makers with clearly identifiable landscape types (e.g. lowland/upper catchment, intensive agriculture versus high nature value) where particular energy-food-environment trade-offs or synergies are likely, in order to target more detailed analyses. **Quick wins:** SWOT analysis of current tools in light of complexity evaluation, development of a nexus landscape typology and testing and calibration of key models in key landscape types.

WP5: Integrated assessment frameworks

Lead: XXX; **Working group members:** XXX. **Description:** WP5 will review, develop and test frameworks for evaluation of specified impacts on complex social-ecological systems. Existing frameworks (set of principles and generalised protocols for actions required to achieve a defined, high-level, goal) include the Ecosystem Approach (as defined by CBD), DPSIR/DPSWR, and the Balance Sheet approach recommended by the UK NEAFO. The WP will build on outputs from WP1-4 to develop assessment procedures that integrate several

evaluation methodologies and knowledge types and which improve on existing (statutory) procedures such as Environmental Impact Assessment, Social Impact Assessment, Strategic Environmental Assessment and Sustainability Assessment. **Quick wins:** SWOT analysis of current integrative frameworks in light of complexity evaluation. Testing the Balance Sheet Approach.

WP6: Methods for evaluating knowledge exchange, learning and behaviour change

Lead: XXX; **Working group members:** XXX. **Description:** This WP will review existing methods for evaluating knowledge exchange (KE), knowledge co-creation, learning and behavior change in the nexus, and then integrate and test new participatory, qualitative and formative (versus non-participatory, quantitative and summative) tools to evaluate KE activities that have occurred in each of our four policy areas. In doing so, the research will deliver new theoretical and methodological insights into KE and behavior change processes that can lead to more evidence-informed decisions in policy and practice, which can reconcile and (where relevant) integrate different forms of knowledge. It will also evaluate the potential for innovative institutional mechanisms, such as the Scottish Government's Centres of Expertise, to rapidly integrate and deliver evidence to inform policy across the nexus. **Quick wins:** SWOT analysis and critical review of current tools to evaluate KE & a guide for decision-makers identifying methods relevant for different purposes/context.

WP7: Knowledge hub and capacity building

Lead: XXX; **Working group members:** XXX. **Description:** A knowledge hub and capacity building programme for methods to evaluate complexity across the nexus will be developed and hosted at the BCU Knowledge ExCHANGE Research Centre. The hub will include: 1) an online knowledge hub hosting regular methods guides (longer) and briefs (shorter) for policy makers and other decision-makers based on WP findings, embedded within a website featuring in-depth case studies, videos and a social media presence; 2) a core suite of methods training workshops, providing on-demand in-house training to institutions working across the nexus, funded initially via the Complexity Centre and subsequently as an independent social enterprise; 3) annual funding calls for advanced training courses and secondments for Nexus Network members; 4) a programme of KE activities linking the Centre with initiatives across the Nexus Network and beyond (e.g. VNN/VNP, VNC, UKERC, EKN and LWEC); and 5) breakfast and lunch-time seminar series for policy-makers in Westminster and the Devolved Administrations. **Quick wins:** launch of methods training with supporting manual for research institutions, businesses, third sector organisations, Government departments and agencies.

Team and management structure

The centre will be led by Co-Directors Smith (PI, University of X) and Brown (University of Y), and a core management team consisting of X, Y and Z supported by WP and PAG leads. WP and PAGS will operate as transdisciplinary working groups, bringing together relevant experts and practitioners in the energy, food and environment sectors. Smith and Brown successfully led the XXX project and the wider team includes other key XXX project leaders, enabling the Centre to build on and significantly expand the legacy of the XXX project to a broader range of policy arenas. Smith has extensive experience leading large transdisciplinary teams and working with policy-makers and other stakeholders. He is Director of the University of X Knowledge ExCHANGE Research Centre and has played a leadership role in research worth £9.5M since 2005. Brown is an ecological economist specialised in development of integrated evaluation methods. He currently directs the X Centre and is Co-PI for the €4.4M FP7 XXX project. The team are united by their passion to produce a step change in the way evidence is co-produced, shared and put into policy and practice across the nexus, and are committed to a strong co-production approach to Centre activities that integrates researches from different disciplines with policy-makers and practitioners as equal members of a transdisciplinary team.

Approach to capacity building, user engagement and community of practice

During the 1st year, the project will prioritise a number of quick wins, identified above in each Policy Area Group and WP. These are intended to be tangible outputs with practical relevance to a range of audiences across the nexus. The project will commence with a full stakeholder analysis and we will co-produce a detailed knowledge exchange strategy with our advisory panel, the co-funders and other key stakeholders.

In addition to these quick wins, we will work with beneficiaries to co-produce and test a wide range of novel methods that are relevant and appropriate for use across the nexus that can:

- Increase the effectiveness of policy-making by enabling policy-makers to better evaluate the likely consequences of policies in complex social-ecological systems across the nexus, including a better assessment of likely social impacts
- Enhance global economic performance of UK businesses, enabling them to better adapt to the complex challenges of future climate change as it interacts with multiple other drivers of change, to secure their supply chains and provision of raw materials and natural resources long into the future, both in the UK and abroad, e.g. with benefits for UK agri-business, water companies, food and drink manufacturers and renewable energy companies
- Provide practical tools for professional practice, for example providing enhanced tools for spatial and marine planning that can help negotiate between different policy and stakeholder objectives, reducing the likelihood of ecosystem service trade-offs from decisions
- Provide tools to enable Third Sector organisations to more effectively assess the likely outcomes of policy positions, and promote and influence policies that will meet the needs of their members and stakeholders whilst not significantly compromising wider societal needs