

Nexus2020: The most important research questions for business sustainability

The University of Cambridge Institute for Sustainability Leadership

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The Nexus Network

Funded by the ESRC, the Nexus Network brings together researchers, policymakers, business leaders and civil society to develop collaborative projects and improve decision-making on food, energy, water and the environment.

The Nexus Network is a collaboration between the University of Sheffield, the University of Sussex, the University of East Anglia, the University of Exeter and the Cambridge Institute for Sustainability Leadership.

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Nexus Network

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Nexus2020 encouraged input from business, academics, policymakers and civil society to determine the most important questions that need to be answered to help companies manage their impacts and dependencies upon food, energy, water and the environment.

The questions that were identified as priorities for research were clustered around five emergent themes, namely:

1. Incentives for change
2. Collaboration and stakeholder engagement
3. Investing in sustainability
4. Supply chains taking a landscape approach
5. Making better policy

The next step is to begin answering these important questions.



“We were able to bring together a unique group of senior business practitioners and interdisciplinary researchers to inform the debate and help shape research agendas. It is crucial that funding bodies see this approach as an opportunity to invest in research that generates high-impact and practical outputs.”

Dr Bhaskar Vira
Director
University of Cambridge Conservation Research Institute

“We recognise that our business is faced with a number of complex and interrelated environmental challenges and we rely on rigorous research to help us address these. For example, better measuring impact and progress is an important area of interest for Asda. We need to collaborate with other businesses and researchers to develop a mechanism that is both useful and reliable. CISL is leading work around metrics with a group of corporates and we are exploring deeper engagement with stakeholders, including investors, to envisage creating change at scale.”

Dr Chris Brown
Senior Director Sustainable Business
Asda



Foreword

Dr Jake Reynolds

How should companies meet the demands of a growing market for food, energy and water without damaging the integrity of the environment on which these services depend? And how should they take account of the additional complexity of climate change, inequality and population growth in their strategies? The interaction between food, energy, water and environmental systems is just one example of a 'nexus' that companies are increasingly being expected to manage. The irrigation of crops, for example, can affect access to drinking water, the health of aquatic ecosystems, and hydroelectric power generation. It is simultaneously dependent on these factors, as well as others such as forest loss, watershed management, pollution, politics and the practices of other companies.

Yet the science of interdependency, particularly in a problem context such as a global commodity value chain, is in its infancy. Arriving at long-term solutions to nexus challenges is proving elusive: the problem is very complex. That said many companies are making serious strides to safeguard soil, water, biodiversity and carbon. As a whole, however, the global business community has much further to go before being able to declare itself sustainable in any scientifically robust sense, and governments have a crucial role in unlocking ambition. Although the endpoint is clear – systems of production and consumption that can, literally, go on forever owing to their restorative influence on the environment – the solutions are multifaceted, location- and context-specific, and subject to significant uncertainty. In a world of limited budgets, the question we ask in this paper is what forms of research would empower companies to make most rapid progress?

The most efficient way for academics to identify the research needs of companies is to talk with them; likewise the most effective way for companies to obtain useful insights from academics is to work with them as partners from the beginning of a research process to its conclusion – and potentially beyond into practice where new questions arise. This is surprisingly rare. A more conventional approach is for academics to engage companies at the end of a research process (or not to engage them at all!) in what is usually referred to as dissemination. The absence of users during the design phase of a research study can inhibit its ability to make sense to – or even be seen by – users after publication.

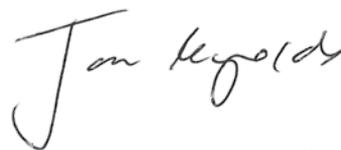
For this reason the Nexus 2020 project set out to build a bridge between the business and academic worlds to identify the top 40 questions that, if answered, would best help companies to manage their food-energy-water-environment nexus dependencies and impacts. This was the first time that these

two communities have been brought together effectively to co-produce research priorities that underpin solutions to nexus challenges such as managing competing uses of land, building resilient supply chains and sustaining livelihoods in resource-scarce parts of the world.

The questions identified by this group reveal the most pressing areas that academics – and their counterparts in business – can act on now. If they are studied in such a way that the companies are engaged fully as partners, shaping the research objectives, methods and timeframe, there is an opportunity to leverage the results at a globally significant scale through the reach and influence of the companies. From a purely academic perspective there is a further significant opportunity: to build relationships – and hence trust – with companies with a view to conducting research in situ within their operations, that is placing the firm – with its data – at the heart of the experiment.

This is not the usual *modus operandi* of academics, some of whom may hold legitimate concerns that co-operation with business could compromise independence or resemble consultancy rather than fundamental research. With careful management, neither need be the case. True co-production – or 'transdisciplinarity' as it is sometimes called – is beneficial to both parties. Companies need sound, multidisciplinary, long-term research engagement to address the dilemma of managing the food-energy-water-environment nexus while maintaining bottom line and competitive performance. Academics need data-rich research environments in which to test hypotheses and uncover new knowledge – and increasingly to demonstrate the value of their work to research funders.

Placing the user at the heart of the research process can offer academics the opportunity to study fundamental questions while delivering concurrent value to companies and society. It is not the default way of working for either party, and requires new skills – and significant patience – to make work in practice. But the prize is immense, which is why we have produced this paper and why we have placed co-design at the heart of CISL's research strategy for the future.



Dr Jake Reynolds
Executive Director, Sustainable Economy
Cambridge Institute for Sustainability Leadership

1. Introduction

Food, water, energy and the natural environment are intimately interwoven and impacts upon one can affect the others.

As pressures start to mount, placing enormous demand upon natural resources, we need to make a step change in practical approaches and policy that will address these growing challenges. One way is to consider the interplay and trade-offs between the nexus of food, water and energy security.

Nexus challenges are widely recognised by business leaders, politicians and academics: for example, how might we ensure food provision for a growing population with less water? How do we make headway on these complex challenges with the often-conflicting roles of business, government and society?

“One of the most positive modern trends for setting research priorities is the systematic use of open, diverse groups and iterative methods. This increases quality, reliability and relevance, while reducing distortion and bias. Another is the growth of co-design by users in research. It is refreshing to see business and academic communities coming together to agree on specific research questions for such an urgent and multidisciplinary challenge.”

Vicky Morgan
Director
UKCDS

1.1 Why should business consider the nexus?

Today businesses are facing changing trends in consumption, population and economic growth that, alongside environmental degradation, can present long-term risks to business viability, consumers and wider society.

The trade-offs that businesses make between food, water and energy are driven by the need to meet the demand of consumers, policy, regulations, the environment and both the immediate and long-term viability of the company.

For some businesses, there will be an imperative to act on nexus issues. Many companies are actively managing the nexus: utility companies provide water and energy directly to customers; and the farming and retail communities are increasingly challenged to grow and source food in an environmentally sound and sustainable way as they compete for customers.

Other businesses are also critically dependent upon water and energy, both directly and indirectly, but must compete with other users such as extractives and commodity traders. Despite these dependencies, some business activities degrade the natural environment; this results in negative impacts that could put businesses at risk now and in the future.

The ability for businesses to act can be constrained by a number of factors. These include limited consumer demand, divergent cultural attitudes, shareholder perceptions and structural market forces. For business to deliver action on nexus issues these external factors also need to be influenced through, for example, policy levers and behaviour-change mechanisms.

There are many unanswered questions around the food-energy-water-environment nexus, such as: what common metrics can be devised to enable nexus comparisons to be made in order to help businesses and investors choose priorities and inform decisions? The answers to such questions could be extremely useful for business decision-makers. They can help guide businesses on, for example, investment strategies, risk mitigation, supply chain management or brand enhancement.

1.2 Business and academics co-create research questions

The Nexus2020 project convened senior business practitioners and leading researchers to identify the most important questions that, if answered, would best help companies manage their food-energy-water-environment nexus dependencies and impacts. This unique group of business and academia considered 722 questions that had been submitted by business, civil society, policymakers and academics over a five month period. Over the course of two days, this group identified the top 40 questions that they considered were the most important to be answered (see part 2).

Nexus2020 was valuable in bringing together business and researchers to challenge each other and work collaboratively. Doing so enabled a) business practitioners to ensure that the selected questions should deliver tangible and useful results that could be impactful for business and b) researchers to consider the feasibility of answering the questions through research.

The co-creation of research questions is vital so that they are both relevant to businesses and answerable through multidisciplinary research.

“The comprehensive co-design process of the Nexus2020 project has successfully addressed sustainability challenges in an integrated way. This method can be standardised across disciplines in order to unpick other challenges in the future and enable business and research to collaboratively address them.”

Professor Lenny Koh
Director of Advanced Resource Efficiency Centre
University of Sheffield

2. Top 40 questions for Nexus2020

- 1 What are the most effective ways to incorporate social considerations into nexus decision-making processes (that allow companies to simultaneously manage their own risks whilst also eliminating risks resulting from their activities on livelihoods, land and water security of marginalised or vulnerable groups) and what are their limitations?
- 2 What are the critical nexus trade-offs, hotspots and risk scenarios and what are the implications of these for business and society?
- 3 What is the relative impact of information, pricing, nudging and taxation on businesses and consumers, and how do these approaches differ in terms of their effectiveness, implications for equity and acceptability?
- 4 What are the most effective ways to incentivise or regulate businesses to value their dependencies and their impacts on ecosystem services (including consideration of the potential insurance value of biodiversity)?
- 5 How can business decision-making tools consider the effects of complex nexus interactions on costs, welfare and ecosystems whilst also including differing temporal and spatial scales of impacts and dependencies?
- 6 What are the pricing mechanisms that enable nexus resources to be most sustainably managed including comparison of costs of avoiding, mitigating or compensating negative impacts?
- 7 How can financial institutions effectively internalise the nexus into their routine risk analysis and decision-making practices?
- 8 What reputational risks or opportunities do nexus impacts and dependencies pose to business?
- 9 How can the impact of primary production globally be quantified and mapped to identify nexus risk hotspots for retailers?
- 10 How can the role of biodiversity on the supply and interdependence of food, energy and water be measured and assessed to enable improved decision-making?
- 11 How can complex nexus interactions and uncertain outcomes be communicated such that they can be easily understood and applied by non-experts (customers and the public)?
- 12 What common metrics can be devised to enable nexus comparisons to be made in order to help businesses and investors choose priorities and inform decisions?
- 13 What are the most effective ways in which information arising from increased supply chain transparency can help foster both greater accountability and greater motivation for positive action across the nexus amongst different actors, whilst also protecting against potential negative consequences for business?
- 14 What are the links and subsequent strategic opportunities between public health costs and managing food, energy and water systems more sustainably?
- 15 What geographic scales of decision-making and governance are best suited to address nexus issues, given differing interactions across landscapes and stakeholders?
- 16 What are the ways in which business models could be changed to incorporate nexus concerns about overconsumption and waste?
- 17 How does the lack of food-crop diversity (dominance of wheat, maize and rice) impact upon the sustainability of the food-energy-water-environment nexus and what are the risks to business?
- 18 What types of policy tools are best suited to positively influencing complex interactions and connections between nexus elements?
- 19 How can the regulatory system (voluntary and legislative) be amended to reflect potential mismatch in temporal scales that exist between business, political, regulatory and natural cycles?
- 20 How can the understanding of the nexus of interactions between food, energy, water and the environment be improved to identify specific incentives that either encourage or impede businesses to implement circular economies?

-
- 21** Under what conditions do actions that improve the sustainable management of food, energy, water and the environment also enhance long-term business resilience and profitability?
-
- 22** What market-based and other financial instruments (including trading systems) will be required to sustain investments in projects designed to achieve sustainable food chains in a volatile world?
-
- 23** How does sustainable management of the nexus relate to the resilience of procurement in a world of more unpredictable prices?
-
- 24** How does managing outcomes across all four nexus elements influence risk in supply chains?
-
- 25** How is the supply and availability of food, energy and water being affected as a result of spatial demographic change and increased competition for land resulting, for example, from urbanisation?
-
- 26** How can businesses be incentivised to make investments that will reduce their impacts and create more sustainable dependencies upon food, energy, water and the environment?
-
- 27** How can public sector procurement be better harnessed to support business practice that minimises negative impacts across the nexus?
-
- 28** How should nexus interactions be incorporated into models to inform decision-making for locating new infrastructure, manufacturing sites and technology?
-
- 29** How can stakeholders be enabled to work together on a landscape level and beyond individual value chains to best address nexus risks and opportunities?
-
- 30** How can the challenges of managing the nexus be integrated into regional/national investment planning?
-
- 31** What are the perceptions of the roles of public, private and civil society responsibility in terms of managing natural resources more sustainably, and how can these perceptions be managed or changed to scale up positive action?
-
- 32** How can governments support and promote more transparent sustainability reporting by businesses?
-
- 33** What are the drivers and barriers that affect private sector decisions to invest in innovative solutions (including technologies) that can have cross-sectoral nexus benefits?
-
- 34** How can business leaders be motivated to improve knowledge and action on nexus dependencies and impacts?
-
- 35** How can funds and resources be directed into reconfiguring supply chains to integrate more sustainable technologies, management processes and materials?
-
- 36** What are the energy and food implications of peak phosphorus as a critical yet finite natural resource?
-
- 37** What are the mechanisms to enhance food, water and energy management and production for urban environments so that these are more accessible, equitable and affordable (for both the developed and developing world)?
-
- 38** How can behavioural change be enabled, including through the use of financial instruments, to improve stakeholder co-operation to deal with relationships between ecosystem services at a landscape level?
-
- 39** How can best practice regarding businesses' sustainable use or production of food, energy, water and the environment be adapted to accommodate different geographies and cultural settings which are characterised by distinct operational conditions and priorities?
-
- 40** What are the local and global impacts of urban food production on more sustainable management of the nexus and can these be translated into sustainable business opportunities?
-

3. Five emergent themes

Ensuring users such as businesses are integrated within research processes can offer academics the opportunity to explore fundamental questions while concurrently delivering value to companies and society.

Investigating these priority questions within overarching themes may help define larger programmes of work. It allows for a transdisciplinary approach to addressing the challenges by engaging business, government and researchers.

This illustrates that the nexus requires an inclusive approach to address the range of complexities and interdependencies so that opportunities can be created for different stakeholders to work together.

3.1 Categorising the top nexus questions for business

Several themes emerged from the top 40 questions for business, highlighting the issues that require more research and better engagement between the research and business communities.

The top 40 questions that were determined by senior business practitioners and researchers were categorised as follows:

- a) Incentives for change
- b) Collaboration and stakeholder engagement
- c) Investing in sustainability
- d) Supply chains taking a landscape approach
- e) Making better policy

3.2 Incentives for change

Business leaders are likely to respond with urgency to issues that address risks and liabilities relating to value creation, within their organisations.

Nexus concerns can begin to manifest in long-term business resilience and profitability; those who proactively respond could thrive.

There is a need to recognise the opportunities to innovate as well as to manage the risks associated with the nexus.

Why is it useful for business?

It makes good business sense to be sustainable. Businesses are looking for the right conditions under which they can effectively implement practical solutions to nexus challenges that will positively impact their bottom line (Q21). Under current models, businesses can gain benefits in terms of growth and profits from encouraging overconsumption and waste which, ultimately, generate significant environmental and social externalities. Whilst taxing or regulating waste and overconsumption may appear necessary, identifying the conditions under which companies stand to gain from reducing consumption and waste will help accelerate business-led action.

What are the gaps?

One missing piece around enabling change is to find the most effective incentives for business to take action: these are often driven by risk reductions. Risk categories can include reputational risk (Q8), considerations around procurement, and the influence the nexus may have on price volatility (Q23). Risks and nexus hotspots first need to be identified (Q2) and then managed to reduce supply chain risk (Q24) as well as to decrease negative impacts for society and business alike. Alternatively, incentives may be in the form of valuing business dependencies and impacts (Q4), establishing the right pricing mechanisms (Q6) or even exploring how market-based instruments can stimulate investments into, for example, sustainable food chains (Q22).

It is not just market and financial instruments that can motivate action but changes in regulatory systems (Q19). Until activities are creating value, and governance structures recognise the importance of investing in these activities, it is hard to create the impetus for business to undertake costly action. With the right triggers, the private sector may be prompted to adjust its business models to account for nexus issues (Q16). However, it is important to understand the relative effectiveness of these drivers and instruments in delivering business responses in order for there to be substantive action (Q3).

Without the right incentives business is unlikely to respond to pressing nexus issues. The questions highlighted within this theme should be answered to encourage business leaders to make change at scale. Without the right incentives business is unlikely to respond to pressing nexus issues.

The questions highlighted within this theme should be answered to encourage business leaders to make change at scale.

Q2 What are the critical nexus trade-offs, hotspots and risk scenarios and what are the implications of these for business and society?

Q3 What is the relative impact of information, pricing, nudging and taxation on businesses and consumers, and how do these approaches differ in terms of their effectiveness, implications for equity and acceptability?

Q4 What are the most effective ways to incentivise or regulate businesses to value their dependencies and their impacts on ecosystem services (including consideration of the potential insurance value of biodiversity)?

Q6 What are the pricing mechanisms that enable nexus resources to be most sustainably managed including comparison of costs of avoiding, mitigating or compensating negative impacts?

Q8 What reputational risks or opportunities do nexus impacts and dependencies pose to business?

Q16 What are the ways in which business models could be changed to incorporate nexus concerns about overconsumption and waste?

Q19 How can the regulatory system (voluntary and legislative) be amended to reflect potential mismatch in temporal scales that exist between business, political, regulatory and natural cycles?

Q21 Under what conditions do actions that improve the sustainable management of food, energy, water and the environment also enhance long-term business resilience and profitability?

Q22 What market-based and other financial instruments (including trading systems) will be required to sustain investments in projects designed to achieve sustainable food chains in a volatile world?

Q23 How does sustainable management of the nexus relate to the resilience of procurement in a world of more unpredictable prices?

Q24 How does managing outcomes across all four nexus elements influence risk in supply chains?

3.3 Collaboration and stakeholder engagement

The private sector can find ways to build collective value with stakeholders by using integrated strategies and collaboration to address food, energy, water and environmental challenges.

Collaboration can be difficult. However, multi-stakeholder partnerships can provide value to business by reducing collective risks, improving livelihoods of local stakeholders and securing access to natural resources for supply chains. The most effective methods of enabling collaboration around nexus issues have not yet been determined.

Why is it useful for business?

Broadening the level of engagement of business through multi-stakeholder partnerships can help businesses gain licences to operate, build more efficient supply chains and reduce costs by sharing the implementation of solutions with others. It may be possible to identify areas for investment that not only have benefits for individual businesses but also have positive outcomes for additional stakeholders and sectors (Q33). This can build commitment across supply chain actors and help to reduce nexus risks.

What are the gaps?

The inclusion of social considerations, in a collaborative way that is beneficial to business, was agreed as the top-priority research area (Q1).

Multi-stakeholder partnerships often require strategies that consider both social and environmental risks of nexus interactions. This often requires businesses to take a longer term outlook than they would when working alone; timescales that encompass these challenges are therefore necessary. Taking such a comprehensive approach could encourage both business and government to reassess supply patterns over different temporal scales and make better informed plans and decisions (Q5).

Q1 What are the most effective ways to incorporate social considerations into nexus decision-making processes (that allow companies to simultaneously manage their own risks whilst also eliminating risks resulting from their activities on livelihoods, land and water security of marginalised or vulnerable groups) and what are their limitations?

Q5 How can business decision-making tools consider the effects of complex nexus interactions on costs, welfare and ecosystems whilst also including differing temporal and spatial scales of impacts and dependencies?

Q33 What are the drivers and barriers that affect private sector decisions to invest in innovative solutions (including technologies) that can have cross-sectoral nexus benefits?

“Asking particular questions, such as those identified by the Nexus2020 project, will help to focus research towards drivers and barriers faced by the industry. A truly transdisciplinary approach is necessary to address the global challenge of achieving food security. Questions identified through Nexus2020 are particularly relevant to work BBSRC is leading with the food sector and I am confident that this project will encourage business engagement in our collaborative research schemes.”

Lorna Friis
Senior Business Interaction Manager – Food Sector
Biotechnology and Biological Sciences Research Council (BBSRC)

3.4 Investing in sustainability

Investment is needed to prevent unsustainable profits, cash-flow problems, supply chain risks and to secure corporate reputations as well as licences to operate.

In a world of tight financial controls and pressures on investment budgets, businesses expect to understand the benefits that addressing the nexus can provide for the company before directing funds to it.

Why is it useful for business?

Businesses are constantly making decisions about how to spend and raise capital. These decisions are influenced by many factors, such as the payback period, anticipated regulatory changes, and assumptions about the volatile world in which businesses operate. The advantages of investing in sustainability can be seen through brand enhancement or opportunities to secure new operations.

What are the gaps?

Businesses are prepared to invest and cut through complexity if they can be appropriately incentivised (see part 3.3). For companies to invest in practices that tackle nexus issues the right enabling conditions need to be set. With these conditions in place, the appropriate flow of finance is more likely to be established, which can promote the scale of action needed around the food-energy-water-environment nexus.

Many of the issues with the nexus may appear to be out of the control of the private sector, not least in the context of competitive markets where costs are subject to change. This is particularly so for traded commodities where prices are set globally and subject to deflationary pressure. The difficulty is that there is a lack of common metrics that can help to inform decisions (Q12).

Companies must act responsibly towards their shareholders in terms of financial return and risk mitigation, but this need not imply short-term profit maximisation. It is in their interest to enable the flow of funds to more sustainable practices that benefit supply chains and reduce risk (Q35). Supply chains need to provide appropriate information for businesses to be able to make decisions on the movement of funds. This can have the dual purpose of informing decisions as well as providing greater accountability in value chains: a logic that the investment community is keen to see more commonly followed as it reduces risk. As financial institutions undertake their own risk assessments there is an opportunity to internalise nexus issues into these decision-making processes (Q7).

Q6 What are the pricing mechanisms that enable nexus resources to be most sustainably managed including comparison of costs of avoiding, mitigating or compensating negative impacts?

Q7 How can financial institutions effectively internalise the nexus into their routine risk analysis and decision-making practices?

Q12 What common metrics can be devised to enable nexus comparisons to be made in order to help businesses and investors choose priorities and inform decisions?

Q35 How can funds and resources be directed into reconfiguring supply chains to integrate more sustainable technologies, management processes and materials?

3.5 Supply chains taking a landscape approach

Taking a landscape approach could enable companies to capture new markets, reduce their supply chain risks and improve business governance.

A landscape approach encourages businesses to look beyond the single entity that they manage and consider the broader context. Landscapes include farmland, forests, rivers and built areas that provide benefits to humans as well as the natural environment. The different land uses and beneficiaries are integrated but can also be in conflict. By taking a landscape approach, businesses can view multiple land uses (perhaps under different ownership) in a holistic manner, considering both the natural environment and the human systems that depend on it.

Why is it useful for business?

A landscape approach can provide businesses with an integrated range of activities beyond their direct operations that support the provision of food, energy and water whilst maintaining a healthy environment and rural livelihoods. A collaborative landscape approach can help businesses to: manage their impacts more comprehensively; consider the effects on other stakeholders; and understand the impacts other stakeholders have on the natural resources the business may rely upon. Taking this type of approach engages local stakeholders and communities who also rely upon the quality and availability of local natural resources. This is important for business as it can affect licences to operate or impact reputations if not properly managed.

Agribusinesses tend to recognise their dependencies upon natural resources and thus the need for environmental conservation strategies: they understand that the raw materials upon which they depend are part of a larger landscape system and that negative impacts in the landscape can have undesirable consequences upon their operations. A landscape-based approach to solutions that considers the local contexts within supply chains can help businesses collaborate with other stakeholders and be prepared for or even prevent these negative impacts from occurring (Q29). This is particularly crucial for businesses where the quality and sustainability of sourcing is a priority, and where licence to operate is important.

What are the gaps?

The top questions that fall within this theme can be helpful to businesses that already have traceability in their supply chains or are involved at the primary production stage of a value chain. Businesses such as retailers and agribusinesses that rely upon raw materials which are sourced from different landscapes have to identify and understand nexus hotspots in order to mitigate and adapt to future challenges (Q2 & 9).

Given the complexity of supply chains, it can be difficult to effectively isolate and address nexus issues across differing geographic scales and with a range of stakeholders. This may differ with varying landscapes and engagements with local

communities; in some instances a landscape scale may not be the most appropriate geographic scale for some business decision-making (Q15).

There is a clear need for decision-making tools that can account for complex interactions at landscape level across different temporal and spatial scales (Q5). Such tools would have benefit for both those businesses involved in primary sectors and those with dependencies on the nexus in their supply chains (Q13).

Q2 What are the critical nexus trade-offs, hotspots and risk scenarios and what are the implications of these for business and society?

Q5 How can business decision-making tools consider the effects of complex nexus interactions on costs, welfare and ecosystems whilst also including differing temporal and spatial scales of impacts and dependencies?

Q9 How can the impact of primary production globally be quantified and mapped to identify nexus risk hotspots for retailers?

Q13 What are the most effective ways in which information arising from increased supply chain transparency can help foster both greater accountability and greater motivation for positive action across the nexus amongst different actors, whilst also protecting against potential negative consequences for business?

Q15 What geographic scales of decision-making and governance are best suited to address nexus issues, given differing interactions across landscapes and stakeholders?

Q29 How can stakeholders be enabled to work together on a landscape level and beyond individual value chains to best address nexus risks and opportunities?

3.6 Making better policy

Nexus challenges have implications for governments and policymaking. The right approach can increase efficiencies in achieving their goals, with positive outcomes across the food-energy-water-environment nexus.

The food-energy-water-environment nexus is raising policy challenges. As demands for natural resources increase, whilst remaining stocks dwindle, it is in the interest of policymakers to find trade-offs that will secure simultaneous access to sufficient food, water and energy to satisfy all interests without compromising the environment.

Why is it useful for business?

It can be difficult for businesses to make headway on nexus issues without government support. Policies that promote sustainable behaviour and reduce impediments to businesses scaling up their successes are needed; for example, what types of policy tools are best suited to positively influencing complex interactions and connections between nexus elements (Q18)? As well as creating a supportive, policy-enabling environment for business, addressing nexus challenges requires joined up thinking between the governmental departments that manage it (in the UK, for example: Defra, Department for Business, Energy & Industrial Strategy, Department for Health).

Issues around the nexus are evident in a variety of ways for governments and their different departments and some recognise the benefits of managing food, energy and water systems sustainably. Despite these benefits, addressing nexus challenges is often not a priority because doing so comes with a cost. Governmental departments which are not prepared to tackle nexus challenges will be most at risk particularly as the associated costs will increase as pressures mount.

Policymakers may be able to capitalise upon existing strategies to deliver resilient nexus systems, such as public health policies (Q14); the linkages and benefits need to be identified first.

What are the gaps?

The nexus needs to be considered at both national and regional decision-making levels as it impacts different scales in distinct ways. For example, trade-offs between water use for agriculture and energy production tend to occur in local contexts and require context specific guidance, whereas policies relating to energy use and impacts upon climate change are more likely to be made by national governments. It comes with the challenge of determining where investment is needed and how this can be integrated into planning and investment cycles (Q30).

Intervention in complex, global supply chains is often challenging due to local political and commercial dynamics. However, governments can play a key role in alleviating businesses' impacts upon nexus elements and supporting reporting mechanisms (Q32).

The right approach to policy and regulation can increase efficiencies in achieving business goals, with positive outcomes across the food-energy-water-environment nexus.

Q14 What are the links and subsequent strategic opportunities between public health costs and managing food, energy and water systems more sustainably?

Q18 What types of policy tools are best suited to positively influencing complex interactions and connections between nexus elements?

Q30 How can the challenges of managing the nexus be integrated into regional/national investment planning?

Q32 How can governments support and promote more transparent sustainability reporting by businesses?

4. Creating opportunities

While this report concentrates on the food-energy-water-environment nexus, other domains of nexus thinking are apparent. For example, there are linkages between policy, business and academia, where each is struggling to make headway on seemingly impossibly complex challenges while impacting, if not necessarily finding ways to engage, the others.

By convening senior researchers and business leaders, the top 40 questions that need to be answered for businesses to address food-energy-water-environment nexus challenges in their practices were identified. In itself this highlighted the connections between policy, business and civil society.

There is an opportunity for established systems, business practices and policy processes to transform themselves through greater emphasis on interconnections, co-design and collective action.

The themes that emerged from Nexus2020 have overlaps. For example, the leverage points that are anticipated to motivate business into action can come from policy, investment or collaboration, all of which were identified as key categories. This simply illustrates that the nexus requires an inclusive approach to address the range of complexities and interdependencies that it covers, and that opportunities can be created for different stakeholders to work together.

By answering questions around operational constraints, incentives and the roles that could be played by different actors, including policymakers and civil society, the private sector may be able to improve its practices to manage impacts and dependencies upon the food-energy-water-environment nexus.

There is a real opportunity to build upon the learnings from Nexus2020 in co-designing research priorities with business and academia. Providing researchers with the space to talk directly with business can provide insight into the application of their innovations. Encouraging business practitioners to be part of the research process can solidify partnerships to deliver impact even before a study is completed.

“Science-based targets for business action on nexus problems is the only prudent way forward. Without science, business lacks knowledge of priority areas. Without business, science lacks the ability to shape practical action.”

Professor Gail Whiteman
Pentland Centre for Sustainability in Business
Lancaster University

5. Next steps

Co-production does not stop here. Multidisciplinary panels of researchers and business practitioners are needed to develop specific projects that can deliver the research required to answer these pressing nexus issues. At the same time, research funding agencies interested in making high-impact investments have an opportunity to promote this co-production approach that can provide value to society, the environment and business alike. Ideally, this should be delivered through an iterative research process: from the setting of the agenda, throughout the project lifecycle to interpretation of results and modification of research.

The co-design of research and collaboration throughout the research process are important for meaningful results to be generated. We recommend that this process be emulated in order for successful, impactful research to be delivered.

Nexus2020 has shown that cross-sectoral partnerships are needed to design new research agendas. It has demonstrated that the process of bringing together businesses and researchers to establish research topics can be successful and fruitful. Businesses are not simply the users of research but must also form part of the solution.

“When commercial opportunities are complemented by research and policy outputs, additional value can be created at multiple levels. From a wider perspective, academic research to deliver information is critical for more supply chains to be sustainable, transparent and equitable. The link between business and academia in designing research brings research outputs to business as real information, which can be used and scaled to drive benefit for business, environment and society.”

Sarah Bell
Head of Supply Chain
Openfield Agriculture Ltd

6. Participants

Attendee	Affiliation
Sarah Bell	Openfield
Tim Benton	University of Leeds
Eva Blixt	Swedish Steel Association
Colm Bowe	Liverpool John Moores University
SarahBroadley	Saint-Gobain Building Distribution
Andrew Brown	Anglian Water
Chris Brown	Asda
Neil Burns	Mondi Group
David Butler	University of Exeter
Hannah Collins	Economic and Social Research Council
Monica Contestabile	Nature Publishing Group
Gemma Cranston	Cambridge Institute for Sustainability Leadership
Helen Crowley	Kering
Justin DeKoszmovszky	Ovo Energy
Leslie Firbank	University of Leeds
Brett Fulford	GlaxoSmithKline
Toby Gardner	Stockholm Environment Institute
Jonathan Green	University of Cambridge
Rosie Hails	Centre for Ecology & Hydrology
Sharla Halvorson	Nestlé
Michael Jack	HSBC Bank
Ben Kerrison	EDF Energy
Lenny Koh	The University of Sheffield
Steven Lang	Ernst & Young
Emily McKenzie	WWF
Pablo Monsivais	University of Cambridge
Tim O'Riordan	University of East Anglia
Jeremy Osborn	Ernst & Young
Stephen Oswald	Bidvest Fresh
Emma Price-Thomas	ArcelorMittal
David Raffaelli	University of York
Jagjit Singh Srail	University of Cambridge
Belinda Reyers	Stockholm Resilience Centre
Bernardo Strassburg	International Institute for Sustainability
William Sutherland	University of Cambridge
Hannah Tranter	Cambridge Institute for Sustainability Leadership
Bhaskar Vira	University of Cambridge
David Webster	Jordans & Ryvita
Ruth Welters	University of East Anglia
Gail Whiteman	Lancaster University Management School
James Wilsdon	University of Sussex

“The whole-system approach is complicated for specialist experts, as it requires a more general understanding across disciplines and sectors. Bringing together a wide range of practitioners and academics can foster this understanding and develop a coherent evidence base. It’s critical that projects like Nexus2020 develop understanding of the longer game to look at root causes of the problems we face and to inform business leaders and politicians on practical, high-leverage interventions.”

Ian Ellison
Sustainability Manager
Jaguar Land Rover

“The importance of co-design and co-delivery of research with the stakeholders who will ultimately use the outcomes has never been greater. The Research Councils recognise this and are working hard to ensure that proactive engagement of business in research design leads to innovation.”

Robyn Thomas
Head of Innovation Programmes and Partnerships
Natural Environment Research Council (NERC)

Cambridge insight, policy influence, business impact

The University of Cambridge Institute for Sustainability Leadership (CISL) brings together business, government and academia to find solutions to critical sustainability challenges.

Capitalising on the world-class, multidisciplinary strengths of the University of Cambridge, CISL deepens leaders' insight and understanding through its executive programmes; builds deep, strategic engagement with leadership companies; and creates opportunities for collaborative enquiry and action through its business platforms.

Over 25 years, we have developed a leadership network with more than 7,000 alumni from leading global organisations and an expert team of Fellows, Senior Associates and staff. HRH The Prince of Wales is the Patron of CISL and has inspired and supported many of our initiatives.

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