

Global challenges require cross-cutting solutions: bringing together water, energy, and food policy

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New research led by the [Tyndall Centre for Climate Change Research](#) suggests that current UK policies on water, energy and food are too fragmented to effectively tackle global challenges. Issues such as climate change, resource constraints and the increasing population cut across several sectors and need similarly cross-sectoral policies. Future research must meet this challenge by focusing on the nexus between sectors, scales and timeframes.

To ensure resilience to complex global challenges, it is necessary to evaluate whether policies and underlying research are working effectively across a range of sectors. It is also important to analyse how existing policies affect the water-energy-food nexus at different scales (local, national, global) and times (short- and long-term). Our [new research](#) does exactly that, exploring how the policies could better function across the water, energy and food-related sectors of the economy.

Looking through the lens of 'land-use' allows us to capture some of the complex water-energy-food interactions. Competing uses for land highlight some of these issues, as the benefits (or 'ecosystem services') we get from land are affected by all three sectors. For instance, bioenergy obtained from crops competes with food for both land and water, as do unconventional fossil fuels such as shale gas. A [recent report](#) from the Cambridge Institute for Sustainability Leadership suggests that by 2030 the UK could face a 7-million-hectare deficit in land to satisfy all of the needs set out by current policies. The competing uses for land illustrate one of the global challenges, namely resource constraints. But land is also being affected by climate change and population growth.

Most UK policies we analysed barely acknowledge interactions with the other sectors. To account for nexus links and trade-offs, [the Water Act](#) could have considered energy and land use. While the '[Water for Life](#)' [White Paper](#) acknowledges the energy sector's significant demand for water, it provides no assessment of this influence. The [UK 2012 Bioenergy Strategy](#) explores greenhouse gas implications but not bioenergy's impacts on water, land or food. By contrast, the [UK Carbon Plan](#) warns that the UK's bioenergy policies could negatively affect 4.5 million hectares of land globally.

Interestingly, the food element of the nexus is not covered by *any* comprehensive legislation – instead it is partly considered by agricultural policies and nutritional guidelines. Yet, there is little integration between, for example, recommended diets and the policies on growing plants and animals, or between [agriculture](#) and [forestry](#).

The UK's current policies clearly have an impact on other countries and even on future generations. For example, UK imports of agricultural products require water and land elsewhere and energy to deliver to the UK. This is an issue of *intra*-generational justice, i.e., happening within the same generation. The water-energy-food nexus also involves *inter*-generational justice: between the present and future generations. By exhausting resources at a faster rate than they can be replenished (such as soil fertility and clean water) and by not mitigating climate change, the current generation robs future generations of the 'ecosystem services' it has itself enjoyed.

One reason for the disjointed policies is a legacy of giving responsibilities to governmental agencies by sector, rather than by challenge. This has led to the nexus elements being treated in isolation, as if water, energy and food had clear boundaries. Accordingly, a coherent long-term strategy for using land has been missing.

To tackle the fragmentation, both policy-makers and researchers are now starting to make the nexus links explicit. For example, in 2010 the Government Office for Science published [Foresight Land Use Futures](#) followed by

the [Making Space for Nature report](#), [The UK National Ecosystem Assessment Follow-on](#), and [The State of Natural Capital report](#). In 2013, the Welsh Government produced The White Paper on the sustainable management of Wales' natural resources leading to a [consultation](#) on an Environment Bill.

Research-wise, integrating any two of the nexus components, be it water and land, or energy and water, is increasingly common among [modellers](#) such as the Lawrence Berkeley National Lab. In 2014, the UK Research Councils started allocating funds to nexus-related research projects and networks, including the [Nexus Network](#), the [STEPPING UP](#) project, and the Centre for the Evaluation of Complexity Across the Nexus ([CECAN](#)).

CECAN is an especially extensive collaboration that engages evaluation practitioners and universities from the UK, Europe and the US, spanning three strands of work. The first is methodological development, to formulate and extend methods for evaluating policies at the nexus. These methods have to recognise the complexity and inter-relatedness of water, energy and food and therefore need to consider such policies' impacts across sectors, across ecosystems and over time. The second strand will apply these methods to a range of case studies, demonstrating the value of the methods in practice. The third strand aims to make the methods more widely known and improve the expertise of evaluation practitioners in government and the private sector.

CECAN is an interesting development because it marks an acceptance that new and more advanced methods of policy-making and evaluation are required to deal with nexus domains and because the Centre, although based in academia, is designed to work in close collaboration with government analysts and policy professionals in a way that is still quite unusual in the UK.

For policies to tackle global challenges effectively, such as climate change, a radical overhaul of the current system of policy- and decision-making is needed, supported by interdisciplinary research. Research has to get its house in order and view ecosystems services as a whole, across different sectors, instead of focusing on what is easy to study or quantify. Engaging businesses and policy-makers through a combination of quantitative assessments, qualitative information and problem-solving techniques can gather different interests around the same table. An interdisciplinary, nexus approach is essential for building countries' resilience to climate change and other complex global challenges.

Disclaimer: this commentary expresses the viewpoints of the authors, and does not represent the views of the Tyndall Centre for Climate Change Research.

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