



Molecules to Landscapes workshop outputs

Introduction

Liz Ogilvie (The Collective) and Dr Jef Grainger (BBSRC) welcomed the participants to the workshop and set the scene for the morning's workshop, with the ambition of moving from describing the problems to finding solutions for them. To do this BBSRC and NERC have identified the need for a 'discipline mash-up', bring together experts from different disciplines, not only to lend their skills and expertise, but also to bring their different ways of thinking about and tackling these challenges, so that novel approaches to common problems can hopefully be found. The design of the workshop therefore was to support as many conversations and connections as possible between diverse groups of researchers, and to promote new collaborations. The workshop kicked this off by inviting participants to join brief introductory breakout sessions to introduce themselves to each other.

On returning to the main plenary room, Dr Sophie Laurie (NERC) briefly outlined the policy context and scientific need for a new community of interdisciplinary expertise in the area of Molecules to Landscapes ([workshop recording](#) approx. 8:40 minutes in the workshop recording) and this was supported by some stakeholder videos provided by Judith Batchelar, Director Food Matters International ([workshop recording approx. 18:30 minutes](#)), and Dr Helen Ferrier, Chief Science and Regulatory Affairs advisor at the National Farmers Union ([workshop recording](#), approximately 21:34 minutes). Participants then joined breakout rooms to discuss some of these issues in the first discussion session.

Breakout Discussion 1 – *“How might we work together to really make a difference? Where are the gaps?”*

- Integration of water quality, runoff, soil diversity at a landscape scale to track stressors in the environment.
- Real-time sensing to allow monitoring data to be applied across multiple timescales as well as at different spatial scales. Collaboration of datasets to effectively bridge this scale gap.
- Designing of methods/toolkits with cost and scalability in mind, to ensure it is as useful to stakeholders/landowners as possible. Outputs must provide economic benefits and capacity building for stakeholders, whilst also taking into account the diverse cultural and political landscape that they would be applied in.
- Effective translation of research across timescales, disciplines, etc. Industry-led research or having industry partners could assist with this translation of research but may have its own issues around ownership of Intellectual Property.
- Building a common vocabulary across disciplines to ensure effective communication. Also, to ensure this translates to the public, stakeholders, project partners, etc.

Following the plenary from Breakout session 1, two more stakeholder views were shared with the participants. The first came from Dr Jon Foot, Head of Environment and Resource Management Agricultural and Horticultural Development Board ([workshop recording](#) approx. 42:30 minutes), and the second from David Christiansen, Oxfordshire Dairy Farmer ([workshop recording](#), approx. 45:50 minutes). Participants used these insights to help inform their discussions in the second breakout session.



Breakout Discussion 2 – *“Thinking of Molecules to Landscapes and a systems approach, what difference could we make by working together? What difference would we like to have made by 2050?”*

- Achieving balanced diets to ensure human nutritional needs are met whilst simultaneously reducing environmental impact, making more efficient use of land, reversing loss of soil fertility, taking advantage of ecosystem services, increasing biodiversity. Increasing productivity/optimising nutritional value without increasing biomass required.
- Developing nature-based solutions with multiple co-benefits to improve efficiency in agriculture to ultimately reduce pollution and minimise environmental impact and impact on human health. Sustainable farming and happy farmers!
- Delivering clearer advice to farmers and landowners – developing a single point for advice on sustainable livestock management, soil conservation, improving surface water quality, promoting biodiversity, etc. This also extends to education into new technology in farming to get stakeholder “buy-in”.
- The rapid development of tools and techniques so that baselines can be measured, leading to the ability to show and measure progress.
- Agricultural policies based upon carbon counting methods that take appropriate account of the differences between methane and CO₂, resulting in a fairer system for livestock farmers.
- Prove that alternative food production is possible. UK farming is often very committed to the food production we have gotten used to over the past 100 years, dominated by livestock production. How can “Molecules to Landscapes” help bring new ideas to our farming system that allows us to start co-producing the farming system of the future? Smarter farming through e.g., more automation (i.e., automatic insect-traps, results fed directly to decision-systems), robotics in fields.
- Create a circular economy within agricultural practice – working to reduce the (economic, environmental, biological) cost of waste.
- Ensuring that any new ideas are suitable in both changing markets (e.g., changing consumer demands) and farming that is increasingly affected by climate change. Also ensuring that any frameworks are scalable, making a tailor-made solution for any stakeholder.
- Effective routes to co-creating solutions with stakeholders.

In preparation for the third breakout session, participants were asked to feedback their general thoughts on the areas they had found most intriguing, inspiring, or areas they wanted to explore further. These were used as themes for the breakout discussions. Participants were able to move freely between rooms to take part in multiple discussions during the time available.

Breakout Discussion 3 – *Themed discussions “wouldn’t it be great if we could...”*

Room 1: The impacts of change in forestry management on landscapes

Despite differences in discipline (molecular biology, landscape, systems biology), participants in the room were keen to keep in touch as there are areas where they can work together.

Room 2: Application of biocontrol in farming systems

The group discussed the desire to produce something genuinely useful within the time and budget limits of the call, the potential for biocontrol solutions to be generally applicable, or tailored for



specific circumstances, and the consequences this might have for developing solutions across the farming spectrum. Conversations were also had about how textiles could be used as a mechanism for biocontrol and suppression of pathogens. This conversation in particular illustrated differences in how the same problem is approached by different disciplines in how funds could be used: supporting primary research vs. funding workshops with researchers having focussed discussions on key challenges. Both options would be within scope of the call.

Room 3: Monitoring of eluents in wastewater

Looking at the development of very sensitive sensors and the use of bioluminescence to trace eluents through wastewater and into the marine environment. Discussion about the potential to use the same approaches in plant/crop monitoring.

Room 4: How to best engage practitioners and stakeholders

Recognition that this is a very busy space – lots of policies, partnerships, datasets, opportunity mapping, etc. makes it quite hard for stakeholders to really see what they should be involved in. The need therefore is not to make this busier by creating more partnerships, but instead to create useful tools that can be used by land-based businesses. Also need to remember that when trying to achieve change, emotions play a key role, and this shouldn't be ignored in the design of any study.

Next Steps

All products and outputs from the webinars and workshop to be written up and made available on the [Molecules to Landscapes](#) website in the 'Additional info' section. As all participants had given their consent their contact details will also be shared with the group.

A reminder of the key dates for the call:

- Closing date for applications: **16:00 24th March 2022**
- Proposals will go through a fast-track assessment, with the assessment panel in **April 2022**
- Funding announcements in **May 2022**
- Projects must start in **June 2022**

Wrap-up

BBSRC, NERC and The Collective thanked the participants for their high levels of engagement and were pleased to see that many of them were already beginning to make new connections and had plans to continue their conversations beyond the workshop.

Questions about the call, the potential for ideas to be within its scope, and for further help and support please contact either Luke.Williams@bbsrc.ukri.org or Rachael.Foy@nerc.ukri.org.

NERC and BBSRC very much look forward to receiving the proposals and wish all applicants to the call the very best of luck.

Workshop closed.