



Leverhulme Centre
for Nature Recovery



The Niche Mapper Analytical Framework - technical report

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Executive Summary

This technical report presents the Niche Mapper analytical framework for visualising the landscape of advice provision for nature recovery. Land managers may access advice on topics related to land-use changes to support nature recovery, with advice offered on specific topics by numerous organisations.

Organisations have unique motivations for advice provision e.g., regulatory, environmental or financial, leading to crowding within the sector¹. The Niche Mapper framework, when applied to a set of organisations who provide advice on a specific topic, will produce a visual representation of the niches occupied by those organisations. The framework may be applied at a variety of spatial scales and/or temporal intervals, resulting in analytically comparable outputs.

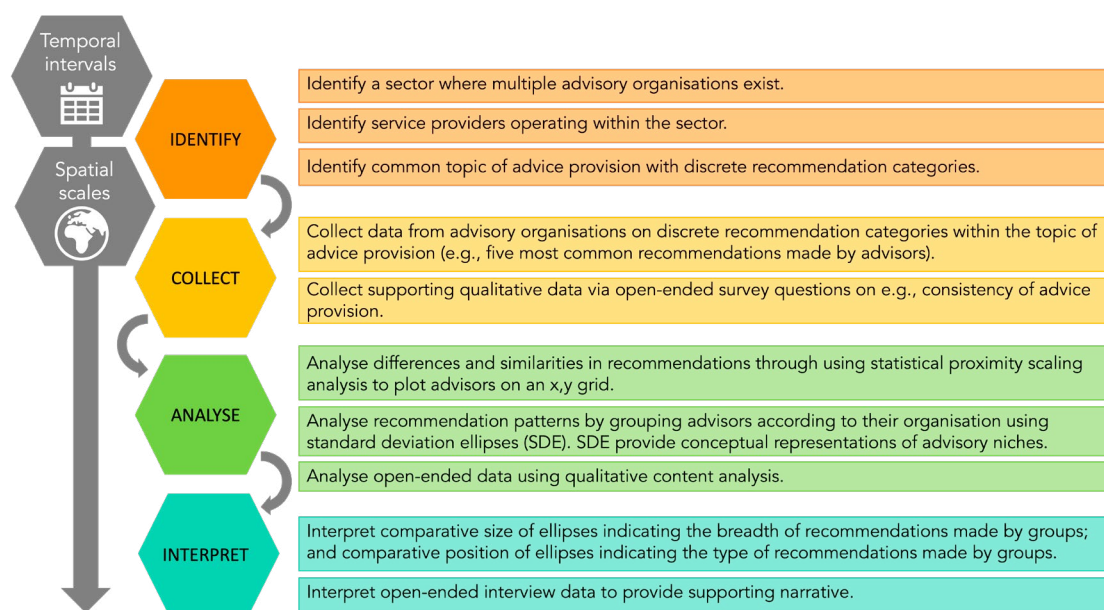
The results provided by using this framework can support effective policy making and divulge new research directions. An example of how the framework has been applied empirically is illustrated through a case study of organisations providing advice to land managers for the mitigation of diffuse water pollution from agriculture (DWPA).

The Niche Mapper Analytical Framework

Overview

Figure 1 provides an overview of the Niche Mapper Analytical Framework which may be applied in any context where advice is provided on a specific topic by multiple organisations, but is particularly suitable for crowded advisory sectors, such as extension services to land managers for nature recovery. The framework consists of four core stages (identify, collect, analyse and interpret). Two iterative stages (temporal intervals and spatial scales) can be additionally employed to provide comparative data where contextually appropriate. A statistical method, PROXimity SCALing (PROXSCAL)², is utilised alongside qualitative analysis to provide complementary interpretations of data. In the remaining sections of this report, the stages of the Niche Mapper Framework are illustrated through an empirical case study.

Figure 1. Overview of an analytical framework to visually map organisational niches in contexts where multiple organisations provide advice on a similar topic, which may be applied at varying temporal intervals and spatial scales.





Stage 1: Identify

Advice provision on diffuse water pollution from agriculture (DWPA) was identified as a sector where multiple organisations offer advice to land managers. Agriculture is a significant source of phosphorous, nitrogen, sediment, pesticides and faecal matter to adjacent water bodies, leading to eutrophication and biodiversity decline. A suite of measures can be implemented by land managers to mitigate against DWPA. These measures form discrete recommendation categories, examples of which are provided in Box 1.

Box 1. Example DWPA mitigation measures (discrete recommendation categories)

Yard infrastructure
Buffer strips
Nutrient management plan
Riverbank fencing
Cover crops
Soil analysis
Tree/hedgerow planting

In England, advice on DWPA mitigation is provided by numerous government, environmental and private organisations (Box 2), each with differing primary motivations for providing such advice³.

Box 2. Examples of organisations and organisation types providing DWPA mitigation and measure advice

Natural England (NE)
Environment Agency (EA)
Catchment Sensitive Farming Advisors (CSFA)
Environmental organisations (e.g. Wildlife Trusts)
Independent specialists (e.g. agronomists)
Water utility companies

Stage 2: Collect

Advisors from each organisation identified were approached via email to introduce the project and invite them to participate. Those who agreed to proceed took part in a structured interview consisting of open-ended questions (Table 1). Questions determined advisors' most frequently recommended DWPA mitigation measures and gathered their views on conflict and consistency of advice provision, as well as their own perception of their organisation's niche within the sector. A total of 133 advisors were interviewed from 13 types of organisations.

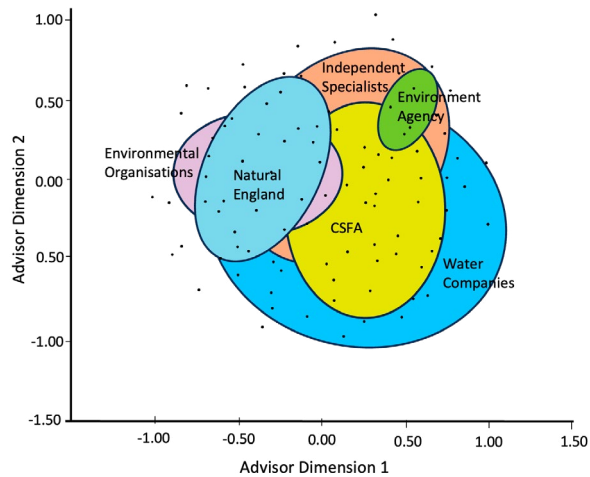
Table 1: Example of set interview questions asked to participants from advisory organisations.

| Interview question | Question purpose |
|--|--|
| With regard to diffuse water pollution, what mitigation measures do you recommend the most to farmers? Please list up to five. | Frequency of discrete recommendation categories for PROXSCAL analysis. |
| What other subjects do you provide advice on? | Contextual |
| Have you ever given advice which has conflicted with other advice the farmer has received? If yes, please provide an example. | Supporting narrative |
| What do you think is your/your organisation's niche in the farm advice sector? | Supporting narrative |

Stage 3: Analyse

Summary tabulations were created from coded interview data to show the frequency of mitigation measures recommended by each advisor. PROXSCAL analysis⁴ was then completed on these summary tabulations using statistical analysis software (SPSS v29). This resulted in x,y coordinates being generated for individual advisors. Coordinates were plotted on a two-dimensional grid, with the proximity of advisors indicating the similarity of their recommendations. ArcGIS software was utilised to create one standard deviation ellipses for advisor groups according to their organisation or organisational type. Ellipses are a visual representation of the 'space' occupied by advisor groupings (for example see Figure 2). Qualitative content analysis was performed on interview responses regarding advice consistency and advisor's own perception of their/their organisation's niche within the sector.

Figure 2. Advisors from across England plotted on an x, y similarity scale based on their stated recommendations with one standard deviation ellipses displayed for advisor groupings.



Stage 4: Interpret

The relative shape, size, location and overlap of ellipses may be visually interpreted to gain insights to the breadth and type of recommendations made by each organisational group. The degree of overlap between ellipses indicate similarity of recommendations, such as the significant overlap between Environmental Organisations and NE, as shown in Figure 2. Distinctions in ellipse locations indicate different sets of recommendations being made by these groups, suggesting that niches exist within the sector. This is illustrated in Figure 2. by the discrete spaces occupied by CSFAs in comparison to Environmental Organisations, NE and the EA. The shape and size of an ellipse indicates the breadth of recommendations made by that group. For example, the narrow, regulatory role fulfilled by the EA is shown by a small ellipse, while the large ellipse of water companies shows that they make a large range of recommendations.

Box 3. Building a supporting narrative: consistency of advice provision

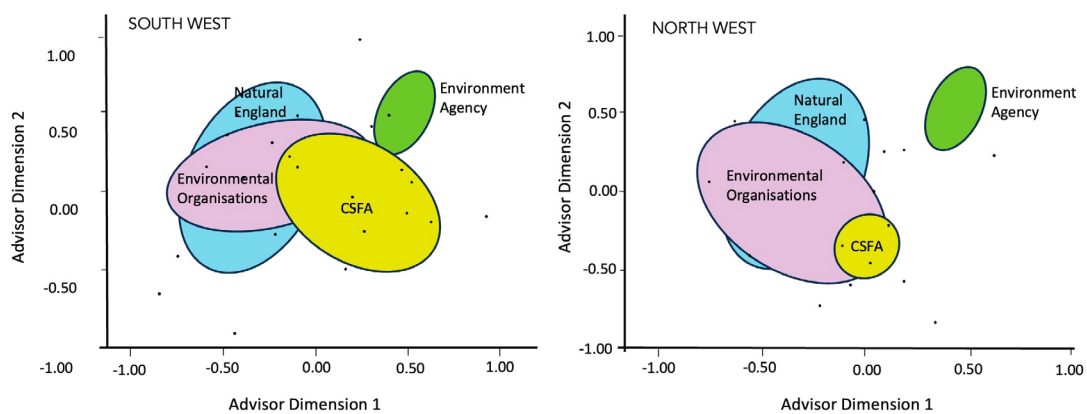
Qualitative data gathered through open-ended questions were coded and analysed for common themes. This analysis was used to build a narrative to support and aid interpretation of the niche mapping exercise. A summary of findings around 'consistency of advice provision' is provided below.

- Advisors from the private sector stated that frequently changing regulations, such as local planning regulation relating to slurry storage, are a source of confusion for advisors and farmers, presenting a barrier to offering up-to-date consistent advice across the sector.
- Responses from advisors across all sectors indicate that inconsistent advice provision between organisations with a different primary focus, such as between those providing financial business advice and those providing conservation advice was common.

Iterative stage: Spatial scales

The four core stages of the analytical framework were repeated across seven regions covering the entirety of England. Insights into advice provision in different localities are revealed when outputs are visually compared. The outputs from two regions, North West and South West, are shown in Figure 3. Here, it can be seen that while organisational ellipses hold similar relative locations, the different size and shape of ellipses show that advice is tailored to local needs or according to different local advisor knowledge pools. Of particular note are the ellipses for CSFAs, where the smaller sized ellipse in the North West indicates a narrower set of recommendations.

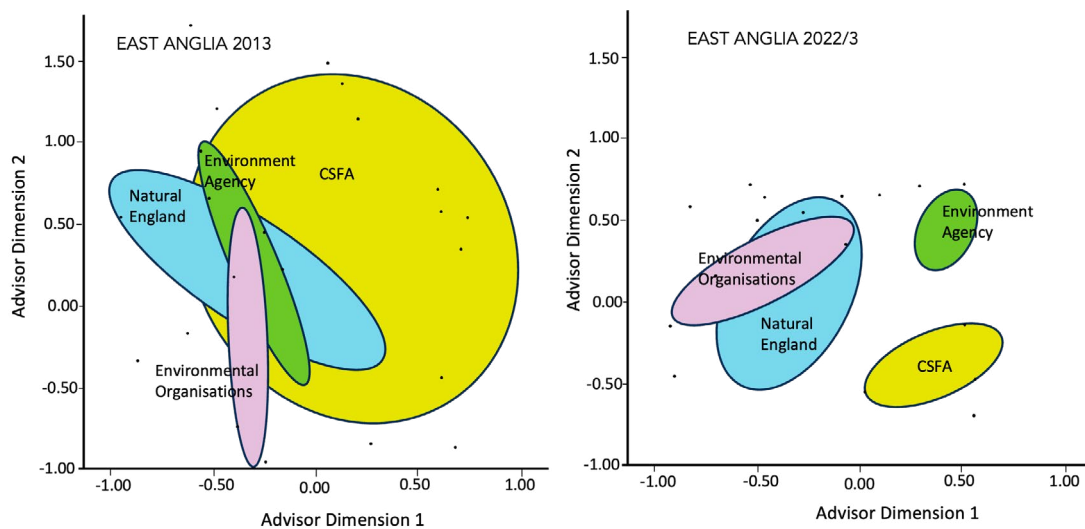
Figure 3. Advisors from North West and South West regions of England, plotted on x,y similarity scales based on stated recommendations. One standard deviation ellipses display advisor groupings.



Iterative stage: Temporal intervals

Repeating the four core stages, and, if appropriate, the spatial scales iterative stage, at strategic temporal intervals can reveal how advice provision changes over time. Figure 4. displays one standard deviation organisational ellipses for advisors from the East Anglian region interviewed in 2013 and 2022/3. A number of interesting observations can be made when visually comparing the outputs. For example, the discrete space occupied by the CSFA and EA ellipses in 2022/3 and marked shift in their relative positions indicates that the type of measures recommended by them has changed in comparison to Environmental organisations and NE. Conversely, the greater overlap of the ellipses in 2022/3 of Environmental Organisations and NE indicate that their DWPA advice may have become more similar.

Figure 4. Advisors from East Anglia region interviewed in 2013 and 2022/3, plotted on x,y similarity scales based on stated recommendations. One standard deviation ellipses display advisor groupings.



References

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About LCNR


The ongoing loss and degradation of nature is one of the greatest challenges of our time. To halt and reverse this global biodiversity decline, the Leverhulme Centre for Nature Recovery was created as a hub for innovative research on nature recovery nationally and worldwide. It brings together experts from disciplines across the University of Oxford, including geography, ecology, social science, finance, economics, psychiatry, anthropology, artificial intelligence, statistics and earth observation. Our team collaborates on a range of projects, working with national and international partners.


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