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# Diffuse Pollution General Binding Rules

## What is on people's mind?

The Scottish Environment Protection Agency is working in partnership to improve water quality across Scotland through awareness raising and targeted action in priority catchments. A key part of this approach is working with farmers to achieve compliance with the Diffuse Pollution General Binding Rules (DP GBRs), essentially a statutory baseline of good practice. Although many farmers are complying with the rules, in some areas there are problems impacting water quality. Researchers from The James Hutton Institute, in close collaboration with Aarhus University in Denmark, have undertaken a study to understand differences in perceptions and views between farmers and other relevant stakeholders (SEPA, agricultural consultants, Scottish Natural Heritage, Scottish Government, etc.) to try and understand why there are compliance issues with the DP GBRs thereby helping to inform the approach and improve water quality in the long term.

# What did we do?

An innovative methodology, called Fuzzy Cognitive Mapping was used. This technique consists of creating a 'mental map' of what is on people's mind when they think about diffuse pollution and regulation to mitigate diffuse pollution. Mental maps are just visual representations of people's views and ideas on a particular topic.

For this research, groups of Scottish farmers and non-farmer stakeholders participated in a series of interviews, where they were asked to discuss the question 'How do environmental regulations affect farmers and farming practice and what is important for compliance with DP GBRs?'. Although the research focused on DP GBRs, it cannot be ruled out that when responding to the questions, farmers and non-farmers also thought about other rules and other interventions relating to diffuse pollution and water quality in general.

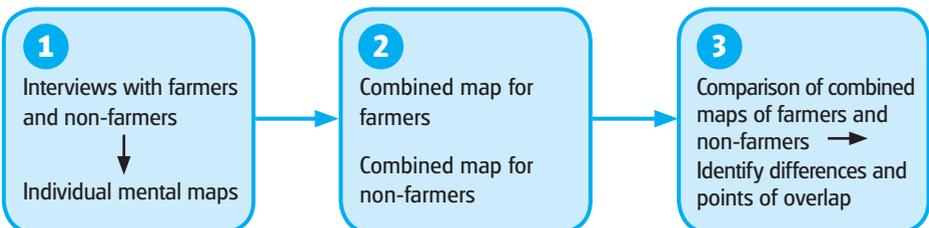
## *Text Box 1. Research details*

*In order to approach the research, a parallel process with farmers and non-farmer stakeholders was carried out. Non-farmer stakeholders (SEPA, agricultural consultants, Scottish National Heritage, Scottish Government, etc.) were interviewed in a workshop organized by The James Hutton Institute with a focus on developing ideas to further improve water quality in Scotland. Farmers were interviewed in one-to-one visits. The specific General Binding Rules covered in this research are:*

- *GBR 18 concerning fertilizer storage and application, which sets minimum distances from watercourses and restrictions on placing fertilizing in sloping lands.*
- *GBR 19 concerning livestock feeders not to be positioned where run-off from the area could enter any watercourse.*
- *GBR 20 which sets a 2m minimum distance of cultivation from watercourses.*

*A total of 9 non-farmer stakeholders and 8 arable and livestock farmers from the uplands and lowlands participated in the research, which included: the elaboration of mental maps, the quantitative analysis of results and a qualitative analysis of interviews.*

**Figure 1.** *The research process*



The research technique allowed us to get a general idea of what are the things that people consider important when thinking about a particular problem, in this case, compliance with DP GBRs. Because it uses 'mental maps' it allows us to get a visual idea of what is in peoples' minds. In this research, this is used to see how farmers and non-farmers look at the issue of compliance with the DP GBR and identify points of coincidence and points of difference between the two groups.

Figure 2 shows an example of how a mental map looks for one particular individual (a farmer in this case) concerning the issue of compliance. For this particular person, important issues when thinking about this topic were: bureaucracy, costs, employment, etc.

*Figure 2. Example of a mental map of an arable farmer when thinking about compliance with DP GBR*

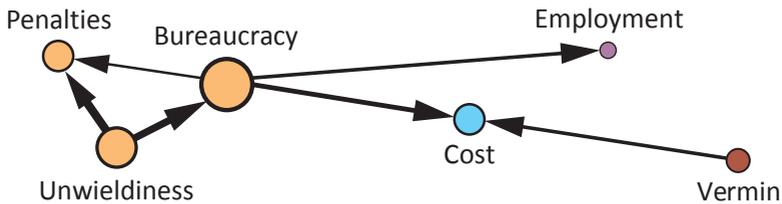
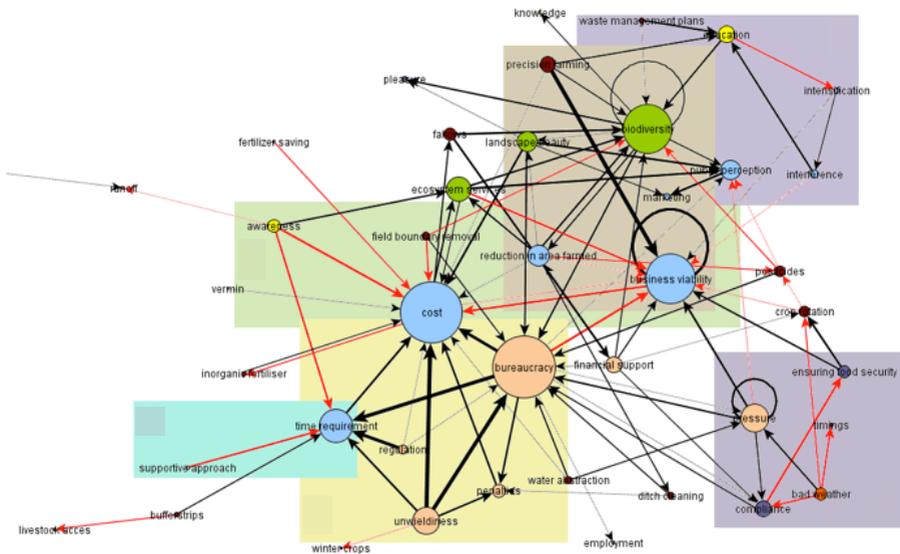


Figure 3 shows the result of combining the maps of all the farmers in the study. It can be seen how costs, bureaucracy are important issues for farmers (they are represented by larger circles). Employment was important for the specific farmer on Figure 2, but this shows less overall relevance when looking at all the farmers together.

*Figure 3. The result of combining the maps of all the farmers in the study*



# What did we find?

The comparison of the combined mental maps of farmers and non-farmers shows some interesting insights:

- First, there is little overlap between most central perceptions regarding compliance with DP GBRs between farmers and non-farmer stakeholders (See Text Box 2).
- These differences can help explaining, at least in part, compliance issues. For example, if environmental education is understood in different ways by farmers and non-farmers, it can be of less help.
- However, there are anchoring points (areas of common interest) where regulation could work upon to improve implementation (See Text Box 3).

*Text Box 2. Some difference between farmer's and non-farmers views*

*For farmers, costs, paperwork and business viability are critical issues affecting compliance. Non-farmers, however tend to associate compliance with issues like education, attitudes and behaviours. Education is a concept that appears both in farmers' and non-farmers' mental maps but they play a different role. For non-farmers, environmental education has a positive connotation, while environmental education is seen as diminishing or reversing agricultural intensification in the mind of farmers, what can be seen as negative for them.*

*Text Box 3. Anchoring points to improve implementation no DP GBR*

*Anchoring points are concepts which may be currently playing a small role in peoples' minds, but overlap between farmers and non-farmers views. These overlapping or common issues can act as leverage points where effort could be deployed to help bridging the differences and helping with implementation of DP GBRs.*

*We found three anchoring points in our study:*

- *Precision farming: increasing technology to help farmers optimize inputs and other management practices.*
- *Supportive approach. In this case, supportive does not mean financial support but helpfulness by regulators and their representatives.*
- *Reducing complexity of the implementation process.*



# What can be learnt from this?

This research has shown that looking at how different stakeholders (farmers and non-farmers) view and perceive the issue of diffuse pollution and compliance with the general binding rules can help better understand the problem.

We have found little overlap between the mental maps of farmers and non-farmers, which might partly explain some of the compliance issues.

By working on areas of overlap (anchoring points), such as precision farming, increasing the support to farmers in a more targeted way and reducing the complexity of achieving compliance, progress can be made.

*The results of this research support SEPA's current one-to-one approach by which farmers receive individual support on how to implement the DP GBRs. This approach is having a positive effect and improvement is already visible. Visit [http://www.sepa.org.uk/water/diffuse\\_pollution.aspx](http://www.sepa.org.uk/water/diffuse_pollution.aspx) for details on the process.*

# Do you want to know more?

The details of this research are published in the form of a scientific publication.

The full reference is: Christen, B., C. Kjeldsen, T. Dalgaard, and J. Martin-Ortega (2015). Can Fuzzy Cognitive Mapping help in agricultural policy design and communication? Land Use Policy 45:64-75.

If you are interested to know more about this research, you can contact:

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# Acknowledgements

This work has been supported by the Scottish Government Rural Affairs and the Environment Strategic Research Programme 2011-2016, the Danish Research Councils, Innovationsfonden ([www.dnmark.org](http://www.dnmark.org) and [www.buffertech.dk](http://www.buffertech.dk)) and the Aarhus University Research Foundation.

Special thanks goes to the participating farmers and other participating institutions (listed below) for their cooperation, and to Andy Vinten for his invaluable support.

## **Organizations participating in the workshops:**

Aarhus University, Denmark; The James Hutton Institute; National Farmers Union of Scotland (NFUS); Private Estate; SAC Consulting, Scottish Rural College; Scottish Environmental Protection Agency (SEPA); Scottish Government; Scottish National Heritage (SNH); University of Stirling.



**Please reference this report as:**  
Martin-Ortega, J., Kjeldsen, C., Dalgaard, T. and Christen, B.  
(2015). Diffuse Pollution General Binding Rules: what is on  
people's mind?. [www.hutton.ac.uk](http://www.hutton.ac.uk)



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