Farmer nutrient management & water quality regulation in Vermont

POLICY BRIEF

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POLICY TARGETING AGRICULTURAL NONPOINT SOURCE POLLUTION STRIVES TO IMPROVE WATER QUALITY BY CHANGING FARMER BEHAVIOR ACROSS THE LANDSCAPE. What farmers are doing on their land and the drivers that influence these behaviors are signals of whether water quality will improve and if behavior is changing as intended. This study compares farmer behavior change and perceptions in three areas: Vermont and the Taupo and Rotorua regions of New Zealand.

IN BRIEF

- In 2015, the Vermont legislature passed new regulations for managing phosphorus on farms (Act 64) in an effort to improve water quality in Lake Champlain.
- From 2016-2018, we interviewed 38 farmers in Vermont and New Zealand to compare farmers' reported behavior change and perceived outcomes in different regulatory contexts.
- Vermont implemented mandatory rules requiring farms to enact a specific set of practices to improve water quality (see Figure 1). In comparison, Taupo and Rotorua, New Zealand both have mandatory performance-based policies requiring farms to stay below a nutrient leaching limit, but give farms flexibility to achieve the limit.

KEY TAKEAWAYS

- Practice- and performance-based regulatory contexts are associated with different types of nutrient management changes across the landscape.
- Vermont's practice-based regulation resulted primarily in physical changes (e.g. fencing or buffers).
- Taupo's performance-based regulation resulted primarily in functional changes (e.g. switch from pasture to forest).
- Across all regulatory contexts, farmers needed financial resources or assistance to achieve physical or functional changes.
- In Vermont, the water quality regulation serves as a back-stop because farmers have used existing incentives to make changes. Conversely, in New Zealand, regulation was noted as the top driver of farm changes.

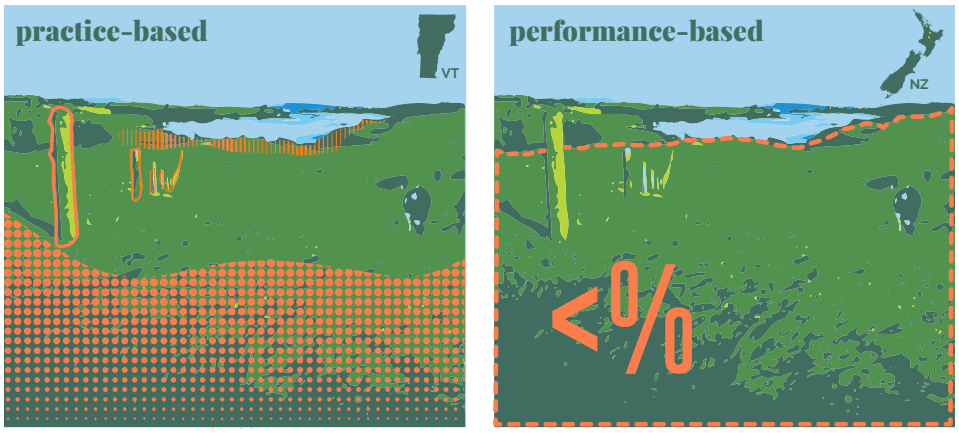

Figure 1. Foci of Practice-Based and Performance-Based policies.

WHAT WE LEARNED - VERMONT

Interviewed Vermont farmers reported making on average almost six different nutrient management changes in the past 5-10 years (see Table 1). Top management changes reported by Vermont farmers were adopting nutrient management plans, changes to seeding or cropping varieties, soil sampling and manure spreading. Top physical changes were buffers, fencing and manure pit upgrades. Top functional changes were purchase or lease of new land and switch to a lower intensity system.

DRIVERS OF BEHAVORIAL CHANGE

Vermont farmers described an incentive-based context that supports farmers with financial and technical assistance. Farmers mentioned regulation as driving behavior change, but it was typically in combination with funding made available through existing programs.

In Vermont the top three drivers of nutrient management changes were:
- Government agency assistance (e.g. NRCS, State funding)
- The water quality policy (Act 64)
- NGOs or other organizations (e.g. land trusts, watershed groups).

WATERSHED OUTCOMES

For Vermont farmers, incentives shape outcomes. Farmers generally reported a lack of negative social and economic impacts in large part due to the availability of funding to ease transition to changes.. They also had mixed perceptions about whether the changes would improve water quality. Some felt that management changes such as cover cropping were having a big impact ecologically, while others felt not much was changing.

COMPARISON: NEW ZEALAND

Vermont's practice-based regulation encourages physical changes (e.g., fencing or buffers). Taupo's performance-based regulation encourages functional changes (e.g., switch from pasture to forest). Rotorua's policy is associated with lower changes overall, in large part because the policy is not yet operational.

Farmer experience with policy differed in each region (see Figure 2). In contrast to Vermont, under Taupo's regulation farmers experienced a dramatic restructuring period for agriculture.

Some Taupo farmers experienced deep pain, while others saw great opportunity and innovation. Rotorua farmers were experiencing uncertainty about the future with a strong policy signal. We hypothesize that their experiences may be similar to Taupo in the long run.

One thing was clear across all areas: farmers needed financial access or assistance to achieve physical or functional changes to their farms. In Vermont, farmers used financial assistance and cost sharing. In Taupo, farmers sold nitrogen. In Rotorua, there were much lower levels of physical & functional changes.

It is unclear, however, how physical or functional changes will differ in their ecological impact over the long term. What this research does show us is that different types of nutrient management changes are emerging in these practice-based and performance-based regulatory contexts. We need a better understanding of what these differences mean for achieving water quality improvements.

Figure 2. The three study locations: Vermont, USA; Rotorua, and Taupo, New Zealand.

Region	Vermont (n=16)	Taupo (n=11)	Rotorua (n=11)
Behavior Change	Average Per Farm	Average Per Farm	Average Per Farm
Management Changes	2.88	3	1.73
Physical Changes	2.5	0.36	1.27
Functional Changes	0.63	1.73	1
Total Changes	5.81	4.55	3.64

Table 1. Average Number of Nutrient Mangement Behavioral Changes per Farm

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