

Managing for Change in Marlborough, New Zealand: Farmer Adoption of Practices

Meredith T. Niles[†], Mark Lubell[†], Margaret Brown^{*}, Robyn Dynes^{*}

[†] Department of Environmental Science and Policy, UC Davis

^{*} AgResearch Ltd., Palmerston North and Lincoln, New Zealand

Issue

This brief discusses several possible management practices that farmers in Marlborough, New Zealand have already adopted and may adopt in the future for climate change mitigation and adaptation. Agriculture may experience significant impacts from changes in water availability, temperature and extreme events. Simultaneously, agriculture plays an important role in helping to reduce greenhouse gas (GHG) emissions and improve environmental sustainability. Agriculture can reduce GHGs through energy and electricity reductions, modified agricultural practices, and carbon sequestration associated with crop and grassland management. Farmers have a suite of practices that may assist them in adapting to these changes and supporting the sustainability of their farming enterprises. However, little is known about farmers' likelihood to change practices in the future and what may influence these decisions. It is necessary to understand the types of practices farmers are most interested in implementing as New Zealand continues to develop climate and environmental policy.

Key Findings

- In some cases, more than half of farmers have already implemented practices to mitigate and adapt to climate change.
- The most implemented adaptation practices include (in their categories) water monitoring techniques (54%), frost protection (35%), and changing to deeper rooting forage (22%).
- Top existing mitigation strategies include (among their categories) planting trees (35%), reducing burning of crop residues (46%), and reducing animal stocking rates (8%).

- The most likely practices to be adopted in the future for adaptation include building water storage, new crop varieties, and reducing stocking rates.
- The most likely mitigation strategies in the future include alternative energy, improved nitrogen and farm equipment efficiency, conservation tillage and reducing stocking rates.
- Cost and farm productivity are the most important considerations for farmers adopting new practices or technologies.

Policy Implications

As New Zealand considers implementation of the emissions trading scheme and strategies for agricultural climate change adaptation it is important to understand the types of practices that farmers are most likely to implement. At the same time, it is necessary to baseline the kinds of mitigation and adaptation practices have already been implemented. This data suggest that in some cases more than half of farmers have implemented adaptation practices related to water and a significant minority have adopted practices to reduce GHGs. At the same time, many animal strategies that can offer sizeable reductions in GHG emissions have yet to be largely adopted. Ultimately, this data can assist policymakers in developing strategies to increase the adoption of agricultural climate change mitigation and adaptation practices.

Methodology

In July 2012, Interviews with 9 agricultural industry scientists/representatives and policymakers and 6 farmers in Marlborough to understand farmers' and agricultural industry climate change perspectives, management strategies, and potential for adopting

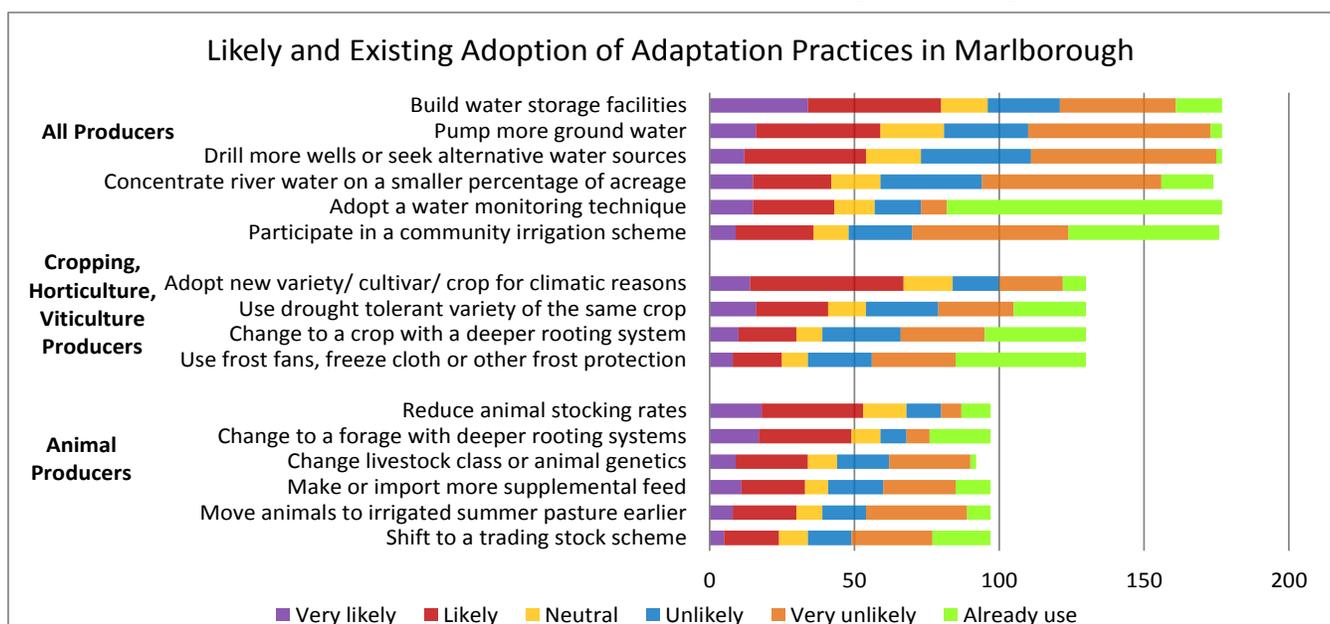


Figure 1. Likelihood of farmers to adopt climate-related adaptation practices in Marlborough in the future. Light green bars indicates the number of farmers who have already adopted this practice. The number of farmers is conducive to the category listed on the left.

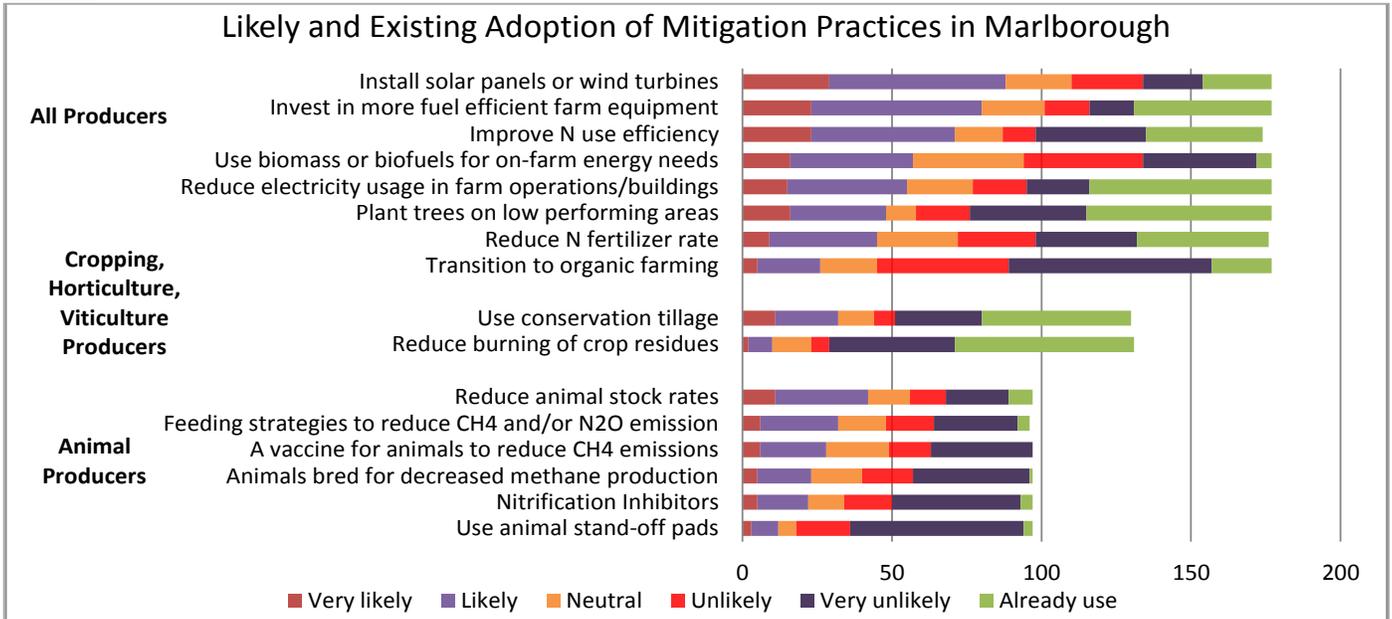


Figure 2. Likelihood of farmers to adopt practices to reduce greenhouse gases in Marlborough in the future. Light green bars indicate the number of farmers who have already adopted this practice. The number of farmers is conducive to the category listed on the left.

new practices in the future. Interviews were used to help design a telephone survey along with input from local agricultural organizations, farmers, and industry. A telephone survey was conducted in the region in August-October 2012 with a total of 177 responses (41% cooperation rate). Among the respondents 80% were male, 68% were full-time farmers and 8% were certified organic. Survey questions asked about farm characteristics, management strategies, existing practices, climate change perspectives, government perspectives, and likelihood to adopt mitigation and adaptation practices in the future. The survey was also conducted in Hawke’s Bay, New Zealand.

Detailed Results

Figure 1 shows, the most implemented practices for adaptation including (in their category) water monitoring techniques (54%), frost protection (35%), and deeper rooting forage (22%). Among non-adopters, the adaptation practices most likely to be adopted in the future include (among their category) water monitoring (52%), new crop varieties (55%), and deeper rooting forages (65%). Figure 2 demonstrates the greatest uptake of mitigation strategies include (in their category) planting trees (35%), reducing burning of crop residues (46%), reducing animal stocking rates

(8%). In the future non-adopters expressed the greatest interest in mitigation practices including fuel efficient farm equipment (61%), conservation tillage (40%), and reducing animal stocking rates (43%). Importantly, we should not that the adoption of these practices cannot be attributed to climate-related issues alone; however, they do offer climate benefits. As Figure 3 shows the most important factors when considering a new practice were: cost (39%), farm productivity (29%), environmental impact (15%), community improvement (8%), Ethics (6%), and time (3%).

Future Research Directions

This study examined the reported existing and future adoption of practices that may assist farmers with adapting to changes in water, temperature and extreme event as well as reducing GHG emissions and improving environmental sustainability. As the data shows, farmers in Marlborough have already implemented a number of both mitigation and adaptation practices. However, it also shows that there are many potential impacts from changes in practice in the future. For example, if most animal producers view reducing stocking rates as a likely practice in the future this has significant implications for New Zealand agricultural productivity, farm income, and export markets. At the same time, a strong interest among farmers for new types of crops and forages is important for industry and academic research. Further analysis will examine the factors that influence adoption decisions. Additional research in the future could continue to monitor the adoption of these practices to understand whether farmers’ stated intentions result in their actual behaviors in the future. There is also a need to link social science and natural science to understand the ecological implications of implementing practices of interest. Finally, for policymakers this research can be used to understand the potential economic and environmental shifts that may occur as a result of change in practice and appropriate policy strategies for optimizing the adoption of climate mitigation and adaptation strategies.

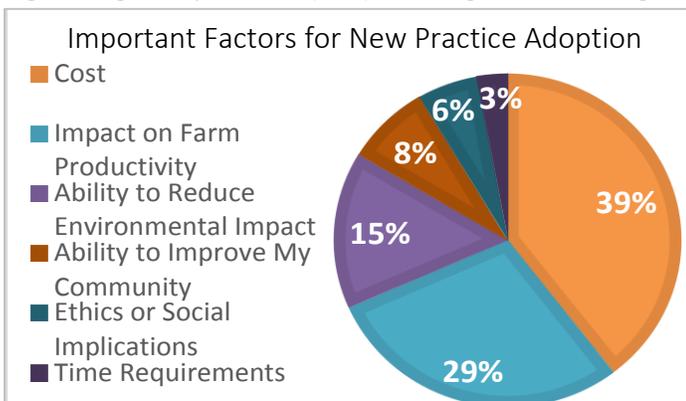


Figure 3. Most important factors for adopting new practices.