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## Cover Crops: Increasing Water Quality and Agricultural Productivity

In the Land of Ten Thousand Lakes, water plays a crucial role in shaping the economy and local identity. Minnesotans take pride in their water's abundance, but this water increasingly faces the threat of pollution and depletion from human activities. Water quality is a multi-faceted issue whose solution will require innovation in areas ranging from the use of road salt to farming practices to hazardous waste site cleanup. It is impossible to address all aspects of the issue at once, so I will focus on one area with potential to improve both water quality and rural economies: cover crop usage.

The Minnesota Department of Agriculture (MDA) describes cover crops as 'grasses, legumes or forms planted to provide seasonal soil cover on cropland when the soil would otherwise be bare.' Though planting cover crops may appear unrelated to water quality, the practice actually creates a dramatic effect. Cover crops reduce soil erosion, create soils that absorb higher amounts of water (reducing runoff), and consume nitrogen that would otherwise leak into the groundwater (MDA). These actions directly combat some of the most pressing threats to Minnesota's water quality. Further, cover crops provide economic benefits through increasing the land's productivity: their use increases soil fertility, aerates compacted soil, retains soil moisture, and reduces fertilizer costs through nutrient cycling.

Though Minnesota's farms have already begun exploring the considerable potential of cover crops, current use is minimal. The most recent USDA Census of Agriculture estimated that cover crops were grown on only 1.5% of Minnesota farmland in 2012. Considering the benefits of cover crops, it is surprising that the practice is not more prevalent. However, Minnesota does face challenges due to the short growing season and lack of established systems for growing such crops. Despite these barriers, cover crops merit further investigation due to their many benefits.

Rural governments should promote cover crops by collaborating with farmers and researchers to develop a comprehensive understanding of how such crops may be adapted for effective use in a cold climate. Specifically, more funding should be directed toward rural governments for applied cover crop research from the State of Minnesota's Clean Water Funds. In 2016-2017, only 4% of these funds were used for applied research, of which cover crop research is only a portion. Considering the potential, additional funds could increase the prevalence of cover crops in a cost-effective and reliable way.

Water quality is an issue that cannot be solved by just one action, but augmenting the feasibility of cover crops could make a noticeable difference in improving water quality. The existence of both environmental and economic benefits to planting cover crops

means that promoting their use would generate collaboration among farmers, rural governments, and researchers, rather than sow division. As the issue of water quality continues to be addressed, cover crops will become a vital part of the solution, and increasing their widespread utilization will bring benefits to all.