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| **Project Title and Description** |
| **Utilizing 4R Nutrient Stewardship to Reduce Greenhouse Gas Emissions from the Application of Fertilizer and Other Crop Nutrients - Canadian Fertilizer Institute**  Project Outcomes:   * Make the economic and environmental benefit information available to farmers regarding the three levels of the 4R Nutrient Stewardship for the application of nitrogen fertilizer and other crop nutrients; and * Provide valuable GHG mitigation information to mixed livestock operations which use both manure and inorganic fertilizer as a source of crop nutrients. |
| **Assessment of Greenhouse Gas Mitigation Potential in Western Canadian Beef Cow-Calf Production - University of Alberta**  Study and quantify greenhouse gas emissions for two relatively new and innovative cow-calf sector strategies: swath-grazed cattle feeding and low-residual feed intake. Swath-grazing is the practice of leaving cereal crops out in the field for cattle to graze during winter, as opposed to feeding hay and bedding at one location. |
| **Soil Nitrogen Supply, Nitrogen Mineralization Function and Nitrate Exposure: On-Farm Tools to Assess and Manage Nitrous Oxide (N2O) Emissions - Nova Scotia Agricultural College**  The development and adoption of greenhouse gas mitigation technologies by providing practical tools that allow producers to understand and apply nitrogen in a more efficient, cost-effective and environmentally responsible manner, thereby reducing impacts on air and water quality, leading to better soil fertility recommendations, a reduction in excess soil nitrate, a reduction in nitrous oxide emissions, and a decrease in other environmental impacts, such as water contamination. |
| **Scale Assessment of GHG Mitigation Strategies in Dairy Livestock-Cropping-Systems - University of Guelph**  Greenhouse gas mitigation strategies in three stages of the dairy-cropping system – feeding strategies, manure management, and cropping systems management. New BMPs will be developed to improve the bottom-line of farm operations and reduce the dairy industry’s impact on the environment. Farmers who implement these BMPs will benefit from economic returns associated with improved milk production efficiency through enhanced feeding strategies. |
| **Beneficial Management Practices (BMPs) for Greenhouse Gas Mitigation from Agro-ecosystems, with Emphasis on Cow-Calf Non-Confinement Production Systems in Western Canada - University of Manitoba**  Greenhouse gas emissions related to livestock and cropping systems with a focus on beef cow-calf operations in non-confinement production systems, where cattle are allowed to graze during the winter rather than keeping them in a confined area. Specifically, the project will study the greenhouse gas-related effects of converting crops from perennial to annual grassland systems; long-term (10-year) crop rotations, and over-wintering cattle in non-confinement production systems. Results of this research will lead to the development of new BMPs that will have a substantial impact on reducing greenhouse gas emissions in the cattle sector. |
| **Effects of Improved Nitrogen and Stand Management on Net Greenhouse Gas Balances in Forage Production Systems aided with the Development of Innovative and Practical Sampling Protocols for Assessing Greenhouse Gas Emissions in the Field. - University of Saskatchewan**  Nitrogen-use efficiency in forage biomass and forage seed production in the Parkland region of Saskatchewan. The project will assess the impact of fertilizer application and improved nitrogen-use efficiency, as well as possible effects on carbon sequestration associated with improved forage biomasss and forage seed production. Farmers will benefit by reducing costs through improved nitrogen fertilizer use for hay and seed production. |
| **Promote the adoption of Beneficial Management Practices (BMPs) that Reduce the Greenhouse Gas (GHG) Balance in Five Agricultural Sectors in Quebec: Poultry, Ruminants, Market Garden Production, Organic Agriculture, and Field Crops - Nature Quebec**  Information on BMPs to reduce GHGs produced by five agricultural sectors: poultry, market garden production, organic agriculture, field crops and ruminants. It will also provide farmers with additional knowledge required to adopt BMPs. Fact sheets with audit forms (e.g. GHG reduction factors, implementation costs) to facilitate farmer decisions will be produced and distributed. This information will help raise awareness of the BMPs and encourage farmers to take action. |
| **Development of a cost-effective, easy-to-use technology for measuring actual Nitrous Oxide and Methane emissions on the farm - Institut de recherche et de développement en agroenvironnement**  Develop and test scientific tools for measuring Greenhouse Gas (GHG) emissions, specifically nitrous oxide (N2O) and methane (CH4). An easy-to-use, accurate and economical technology is essential for farmers to determine the status of on-farm GHG emissions. Without a tool for farmers to use, it will not be possible to determine the effectiveness of farm production in terms of GHG emissions. Devices such as the proposed passive flux samplers in this project are essential tools for the agricultural sector and will help farmers measure GHG emissions on the farm. |
| **Silvopasture Field Pilot - Government of British Columbia**  How the integration of trees, forages and livestock can mitigate greenhouse gas emissions while contributing to increased productivity. The project will examine how the practice of combining forestry with forage and livestock production in the southern interior of B.C. will support greater biological and economic diversity and benefit the environment. Results of this project will generate new beneficial management practices that improve riparian stewardship, address impacts of livestock grazing on water quality and quantity, and mitigate greenhouse gas emissions. |
| **Demonstration and investigation into livestock systems adoption - The Upper Assiniboine River Conservation District**  Agroforestry, the practice of planting trees in combination with crops, forage and livestock can help farmers reduce production costs and enhance yields while continuing to protect the environment. This project will evaluate various beneficial management practices on the farm to see if they can be easily adopted by the farming community. Results of this research can mitigate greenhouse gas emissions (GHG), improve nutrient cycling and biodiversity, enhance energy savings and reduce impacts on riparian water zones and water quality. |
| **Shelterbelts as an Agroforestry Management Practice for the Mitigation of GHGs - University of Saskatchewan**  How shelterbelts - made up of one or more rows of trees or shrubs planted in such a way as to provide shelter from the wind and to protect soil from erosion – and other agroforestry plantings to see how effective they are in sequestering carbon and how they can better serve as carbon sinks. The project is exploring new shelterbelt designs and strategies to meet environmental and energy demands. Recent research suggests that this agroforestry practice may help farmers reduce their carbon footprint and improve animal health and soil protection.  Through a better understanding of how various shelterbelts and agroforestry plantings sequester carbon – and how shelterbelts can serve as carbon sinks – farmers will be in a better position to understand the significance of key shelterbelt management decisions with respect to environmental benefits and economic potential. |
| **Tree-Based Intercropping: An Agroforestry Land Use for Greenhouse Gas Mitigation in Canadian Agricultural Systems - University of Guelph**  Study and assessment of how tree-based intercropping, a European agricultural practice that incorporates trees onto the farm, can mitigate greenhouse gas emissions and enhance carbon sequestration in tree biomass and agricultural soils. Tree-based intercropping has the potential to reduce significant amounts of carbon and nitrous oxide emissions without impacting agricultural productivity on the farm. Researchers hope that adopting tree-based intercropping into Canada will provide producers with diversified farm income while improving environmental performance of their farms. |
| **Effects of hybrid poplar agroforestry systems on carbon sequestration in agricultural landscapes of eastern Canada - Eastern Township Forest Research Trust**  The potential for riparian and upland agroforestry buffers to sequester carbon in agricultural landscapes in Eastern Quebec. Researchers hope to generate new data on greenhouse gas mitigation in hybrid poplar agroforestry systems that will increase the capacity of agricultural landscapes to mitigate greenhouse gas emissions. |
| **Quantifying carbon sequestration and Greenhouse Gas emissions in planted shelterbelts, natural hedgerows and riparian woodlands in different soil-climatic zones in Alberta. - University of Alberta**  This study will examine the contributions to carbon sequestration and Greenhouse Gas (GHG) reductions in different soil-climatic zones of three agroforestry systems (planted shelterbelts, natural hedgerows and riparian woodlands). The work products of this study will provide a basis for quantifying the value of these practices for facilitating carbon storage and reducing GHG emissions.  It is anticipated that the research will involve farmers by using their land as study sites to demonstrate that agroforestry systems have the capacity to be effective carbon sinks and to reduce GHG emissions. This project will also enhance the understanding and accessibility of beneficial management practices (BMPs) that can be adopted by farmers to mitigate GHG emissions in Canada. |
| **Grow More and Emit Less: Managing the Impact of Agricultural Drainage Management on Green House Gas (GHG) Emissions - The South Nation Conservation Authority**  The study of new drainage practices to benefit both producers and the environment. The project will focus on how controlled tile drainage, a beneficial management practice that allows producers to manage water using a simple, inexpensive modification to their existing field drainage systems can potentially mitigate greenhouse gas emissions (GHG) caused by cropping activities while simultaneously improving water quality and crop yields. This research will help farmers reduce costs and increase crop yields, while also lessening the impact on the environment. |
| **Water Conservation Practices for Production of Woody Perennial Horticultural Crops: Beneficial Management Practices for Mitigating Greenhouse Gas Emissions - University of British Columbia**  How water conservation practices affect GHG emissions and carbon sequestration in fruit production systems. Researchers hope to generate recommendations for producers on ways to sustain production, while reducing their water use and environmental impact. This information can then be applied to agricultural systems in other parts of Canada and the world.  The project will also identify beneficial management practices (BMPs) for mitigating GHGs in irrigated production of woody perennial crops and transfer this knowledge to farmers, as well as greatly improve our understanding of the processes. |
| **Improved water and nutrient use efficiency to maximize the net greenhouse gas balance in irrigated production systems - The University of Saskatchewan**  Identify how increased levels of moisture and fertility associated with irrigated production systems influence greenhouse gas emissions. There is currently limited information on greenhouse gas emissions and carbon sequestration under irrigated conditions, especially in the semi-arid regions of the world. Researchers expect that this study may yield beneficial management practices that promote increased water savings, reduced irrigation pumping costs, and improved nitrogen use efficiency. |
| **Effects of agricultural water management systems on greenhouse gas emissions in Eastern Canada - McGill University**  Greenhouse gas emissions using irrigation and drainage management practices under horticultural crop production in Eastern Canada. The primary focus of the project is to determine the effects of different irrigation and drainage management practices on nitrous oxide, carbon dioxide and methane emissions, and carbon sequestration on both mineral and organic soils. Results of this research will provide farmers with agricultural water management technologies that reduce greenhouse gas emissions and enhance economic competitiveness. |