Agri-Environmental Partnership of Alberta: Input to Climate Leadership Discussions

September 30, 2015

The primary agriculture sector in Alberta is very diverse, complex and highly integrated. It is impacted by a large number of external factors that cannot be controlled including global markets, climatic variations, insects and disease. Farmers are price takers. They must absorb any increased production costs since these cannot be passed on to consumers.

Alberta's agriculture sector accounted for about 8% of provincial greenhouse gas (GHG) emissions in 2013[1]. Unlike other sectors that typically have one source of emissions, there are two main areas of agricultural GHG – methane and nitrous oxide – along with a small amount of carbon dioxide emissions from fossil fuel combustion. Beef cattle are the source of about half of agriculture's total emissions (from methane emissions). Fertilizer and manure management are sources of about 40% of agriculture's total emissions (mostly nitrous oxide and some methane emissions).

From 1990 to 2013 crop productivity increased at twice the rate of the increase in emissions. Much of this occurred because the agriculture sector already made major system improvements to reduce the emission intensity of production. Agricultural land also has the capacity to act as a biological sink for carbon dioxide emissions; soil can sequester considerable amounts of carbon. In addition to reducing the sector's emissions, carbon sequestration presents an opportunity for agriculture to help offset emissions from large emitters.

GHG emissions from agriculture are complex and need to be thoroughly understood in order to make choices to lower emissions by changing management at the farm level. Family farms have a range of production practices to produce a variety of products depending upon where they are located and on business circumstances. Given the global expectations on climate change and emissions, the sector needs information and data to understand and make decisions for any effective changes. Government policies, education, extension and research should aim to increase farmers' awareness of practices that will reduce emission intensity while ensuring the economic viability of Alberta's farms.

Agriculture covers 40% of land management in Alberta and generates substantial social, economic and environmental benefits for all Albertans, such as affordable and sustainable food production, cleaner water, flood mitigation, aesthetic landscapes, thriving rural economies, biodiversity, and wildlife habitat. Impacts of management changes to reduce emissions must also be assessed in the context of the impacts to these benefits.

A policy to broaden the carbon tax to include all emitters has the potential to negatively impact agricultural production. Since farmers are unable to pass on increased costs, increased fuel prices could negatively affect the sector's ability to compete in domestic and international markets, and potentially undermine the economic viability of Alberta farms at a time when industry needs to help meet increased food production demands in response to world population growth. A thorough assessment of unintended consequences to the sector must be conducted and considered before any changes to carbon taxes are made.

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Key Messages

- Farming practices in Alberta have been continually improving and are among the most advanced globally. Farm businesses will continue to improve as opportunities arise.
- Flexible, adaptive and voluntary policies that provide incentives and develop and share information will enable the sector to increase production efficiencies and reduce emissions while contributing to economic growth and diversification.
- Further research is needed to identify the scientific, economic, policy and verification basis for practice improvements that can help lower emissions and increase food sustainability without creating barriers of increased costs of production.

Based on current levels of improved practice and research conducted to date, the potential for agricultural emission reductions is not large and will not have a significant impact on provincial emissions overall. However, the role of agricultural management to enhance carbon sequestration is potentially high. Where practice changes make sense and are sustainable, the agriculture sector can contribute to GHG reductions in the following ways:

1. Increasing nitrogen use efficiency using the full 4R Nutrient Stewardship plan (Right Source @ the Right Rate, Right Time, and Right Place)[2]. Potential reductions of 25% of nitrous oxide emissions at 50% adoption of the Advanced Nutrient Stewardship plan by 2035 could result in emission reductions of about 12% of agricultural emissions, which is 1% of total emissions in Alberta.
2. Selecting best genetic traits in beef cattle for low Residual Feed Intake[3]. A 30% adoption rate by 2035 could reduce agricultural emissions by 4%, or 0.3% of total emissions in Alberta[4].
3. Increase soil carbon sequestration. Conversion of class 4 to 7 cropland to perennial crops in Alberta's Dry Prairie region (0.8 M ha or 2 M ac) by 2035 could potentially sequester up to 7% of agricultural emissions, or 0.5% of total emissions in Alberta[4]. Further assessment of policy basis to address permanence is needed, as well as impacts of any increases in livestock numbers.
4. Increase use of agricultural carbon offset protocols. Agricultural protocols quantify reductions and removals from improved agricultural management. To date only two of ten agricultural protocols have been used at the $15 / T CO2e carbon price that is currently capped by the Climate Change Emission Management (CCEMC) Corporation fund option for companies regulated under the Specified Gas Emitters Regulation (2007). Increasing carbon prices to $30 / T CO2e by 2017 in Alberta could encourage adoption of new agricultural offset projects. The financial value of carbon offsets to individual farms is currently not significant and often presents an administrative burden (verification and associated transaction costs). Further assessment of the verification basis for demonstrating practice changes and streamlining of the process is needed to increase the use of protocols by the agriculture sector.
5. Increase restoration and retention of wetlands. Voluntary restoration of wetlands on farmland has the potential to sequester significant amounts of carbon[5]. Retention of existing wetlands has been shown to be an even more effective mechanism for sequestration[5].

References

[1]Environment Canada. 2015. National Inventory Report 1990-2013: Greenhouse Gas Sources and Sinks in Canada. Available at http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=83A34A7A-1

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[3]Basarab, J.A. , K.A. Beauchemin, V.S. Baron, K.H. Ominsky, L.L. Guan, S.P. Miller and J.J. Crowley. 2013. Reducing GHG emissions through genetic improvement for feed efficiency: effects on economically important traits and enteric methane production. Animal. 7:303-315.

[4]Toma, D. and M. Anderson. 2014. Projected Emissions to 2050 and Reduction Projects in Alberta's Agriculture Sector, Alberta Environment and Parks, Edmonton, Alberta, 52 pp.

[5]Badiou P., McDougal R., Pennock D., Clark B. (2011) Greenhouse gas emissions and carbon sequestration potential in restored wetlands of the Canadian prairie pothole region. Wetlands Ecology and Management 19:237-256.

The Agri-Environmental Partnership of Alberta (AEPA) is a diverse multi-stakeholder partnership of the agriculture industry, government and an environmental non-government organization, working together to proactively address agri- environmental issues from a policy perspective. http://www.agpartners.ca