- Economically Feasible – potential cost savings and increased yield through efficiency gains and better management;
- Scientifically Defensible – supported by research findings relevant to Canadian context;
- Easy to Communicate – rounded numbers for percentage, reference and target year.

Approach to meet the target

- AAFC will engage with fertilizer manufacturers, agricultural stakeholders, PTs, and farmers to establish voluntary agreements, which would include a description of measures to put in place to meet the 30% reduction target.
- Consultations on how to progress toward this target would start in 2021, with a view to securing voluntary agreements by 2022.
- Status of implementation and progress towards achieving the target will be assessed in 2025.
- [redacted]

Policy Options

- A number of policy measures could be put forward for consideration beyond just a 'voluntary agreement'. A suite of policy approaches will be necessary, and consideration to be given to a regulatory backstop should voluntary approaches not be successful.
- Scientific research findings, including from research projects undertaken by AAFC scientists, point to a 25%-to-35% potential reduction in nitrous oxide emissions associated with fertilizer use through wider use of better fertilizer products and wider adoption of better nutrient management farming practices. An example of an industry-led initiative that could help guide reductions in fertilizer emissions is Fertilizer Canada's 4R approach
- Offsets also represent a potential revenue stream, and an opportunity to advance nutrient management practices that will impact fertilizer emissions. For example, the *Quantification Protocol for Agricultural Nitrous Oxide Emission Reductions* available under the Alberta Emission Offset System includes a reduction of at least 25% associated with intermediate and advanced levels of nutrient stewardship management.
- Provincial governments are also establishing goals for effective nutrient management, including;
    - SK = By 2025, 25% of Saskatchewan's cropland under 4R designation
    - QC = 15% reduction in nitrogen fertilizer inputs on areas under cultivation. Reduction of 500,000kg of fertilizer sold

Potential Measures and On-Farm Actions to Achieve the Target

- Identification and selection of any path forward on this target will require industry input and buy-in through the consultation process. However, a number of existing best practices and technologies could play a role in attaining the target. These include the 4R Nutrient Stewardship approach advocated by Fertilizer Canada; controlled release and other advanced fertilizers; use of precision agriculture technologies; beneficial management practices (BMPs) such as soil testing; and regenerative agriculture practices.

Annexes

Annex A: What We Heard Phase One

Over the course of the informal engagement sessions that took place in Spring 2021, AAFC engaged virtually with the provinces and territories and 22 agriculture producer and commodity associations. The Department also received written feedback from 12 stakeholders comprising a mix of provincial and national agriculture organizations and provinces. The feedback received from agriculture stakeholders to date can be categorized under eight main themes:

1 / 2) - **Concerns on the impact on yield and export growth/ absolute emissions vs. emission intensity:** Several agriculture commodity and producer associations noted concerns that the fertilizer emissions reduction target could result in a decrease in crop yields. They questioned setting a target based on absolute emissions vs emission intensity which appears to be in direct conflict with the Government of Canada's export growth target of $75 billion worth of agriculture and agri-food commodities by 2025.

3) **Barriers to the adoption of sustainable practices and technologies**: Stakeholders identified the cost and availability of technology as a key barrier to the adoption of sustainable practices. For example, lack of rural availability of broadband and limited access to impartial agronomists and precision agriculture technology were raised as obstacles to accurately determining fertilizer needs and using fertilizer more sustainably.

4) **A need to incentivize producers to adopt new practices through programs and/or funding**: Given stakeholders indicated the target could hinder production and would likely require additional resources; incentives, financial safety nets, and funding to adopt new BMPs were recommended in order to incentivize farmers, encourage adoption of new practices and mitigate financial risk.

5) **A need to reflect Canada's diverse geography and farming practices**: In light of Canada's diverse geography and crops, stakeholders underlined the importance of adopting a regional approach, including data needs, when assessing tools needed to meet the emission reduction target.

6) **The importance of communication in order to increase the likelihood of farmer acceptance of the target**: It was suggested that a communications campaign targeting farmers focus on the economic and environmental benefits of efficient fertilizer uses, including through case studies. Efforts should be made to educate the public on the role of fertilizers and how they fit within the government emission reduction strategy.

7) **Challenges surrounding the development and participation in voluntary agreements**: Stakeholder suggested agreements be complementary with other federal agricultural initiatives and aligned with existing practices, such as 4R.

8) **A lack of reliable data to accurately measure fertilizer emissions**: Stakeholders regarded the need to address the lack of benchmark data, fertilizer-use data, and emissions data in order to accurately measure actual emissions and progress.

CAVEATS

While this science-based perspective is based on conservative estimates, significant uncertainties remain which suggest that, even if BMPs are as successful as anticipated and are fully adopted, the cumulative reduction at a provincial level (for example) may be less than the estimated potential.

- Estimates are based on experiments (small plots, research conditions) and may not be realized in every region or every condition at real scale.
- In some cases, some practices have led to substantive emission reductions under specific conditions, while reversals (increases in emissions) were noted under different research conditions.
- A number of the BMPs mentioned in this report are not currently captured in the National Inventory methods due to lack of farm activity data. Effort is needed to gather this data to capture the extent to which practices have changed from 2005 to present and to incorporate these practices into the inventory methodology.
- Estimates are relative, meaning they assume a comparison between standard and enhanced practices (BMPs). However, some or even many of these practices are already in use, therefore limiting the potential for further reductions. For example:
    - Considerable effort on the Prairies to move farmers to the 4R approach
    - Most farmers in the Prairies are already using conservation or no tillage
    - There is a reasonable (but variable) acreage of pulse crops already in place

Potential Future Opportunities and Priorities

- **Federal Greenhouse Gas Offset System**
  - Enhanced soil organic carbon identified as an early agriculture-related protocol for development – potential for more agriculture protocols in the future;
  - Currently consulting on regulations.

- **Clean Fuel Standard**
  - Support opportunities for farmers producing feedstocks for new low-carbon biofuels.
  - Not intended to impact feed grain market.

- **National Adaptation Strategy**
  - To be developed with provincial, territorial, and municipal governments, Indigenous peoples and other key partners;
  - To help manage risks to agriculture and food systems, including adverse impacts on agricultural crops and the agriculture sector due to changing climate and environmental conditions.

The Government of Canada also strongly supports agronomic techniques and services within the agriculture sector. The On-Farm Climate Action Fund will directly support farmers under three target areas – one of which is agronomic services to develop farm-specific nutrient management plans, equipment modifications for fertilizer application in fields, and soil sampling and analysis.

Sean Meagher

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From: Roberts, Mary Jane <maryjane.roberts2@AGR.GC.CA>
Sent: Friday, October 1, 2021 10:18 AM
To: Meagher, Sean <sean.meagher2@agr.gc.ca>
Cc: Tuck, David <david.tuck@AGR.GC.CA>
Subject: RE: Possible Response to Reporter for fertilizer article

Agree with the approach, Sean. Interestingly, Fertilizer Canada itself acknowledged during a RealAg podcast last week

[redacted]

To summarize:

- The national target is focused on emissions from fertilizer application, not on volume of fertilizers used
- There are no mandatory cuts in fertilizer use
- Canada has not stated that it is adopting the EU model
- The target is to be achieved through voluntary agreements with the sector

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From: Meagher, Sean <sean.meagher2@agr.gc.ca>
Sent: Friday, October 1, 2021 9:43 AM
To: Roberts, Mary Jane <maryjane.roberts2@AGR.GC.CA>
Cc: Tuck, David <david.tuck@AGR.GC.CA>
Subject: Possible Response to Reporter for fertilizer article

Hey Mary Jane,

Another article here on fertilizer emissions.

We are suggesting going back again with a clarification message – much like the one we did the other day.

A few of my notes that would warrant a correction:

- "Mandated cuts in fertilizer use" – that would of course be costly, but nobody is mandating anything at this point, and GoC targets are based on cutting emissions from fertilizer use, not cutting the use of fertilizers altogether.
- [redacted]