Alberta Wheat and Barley Commissions
Fertilizer emissions reduction target consultations

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Alberta Wheat and Barley Commissions are non-for-profit, farmer funded and directed organizations. The farmers we represent are middle-class, family farms that have been succeeded from past generations and will be passed down to the next generation. Our farmers are innovative entrepreneurs who continually incrase production through sustainable, efficient farming practices and investments into scientific research and continual adoption of emerginy technologies that improve their soil for the generations to come.

On behalf of the over 17, 000 grain farmers that the Alberta Wheat and Barley Commissions represent please accept our input into the Government of Canada's consultation related to; reducing emissions arising from the application of fertilizer in Canada's agricultural sector.

The Government of Canada's proposed national target, announced in the "*A Healthy Environment and a Healthy Economy Plan",* to reduce greenhouse gas (GHG) emissions arising from fertilizer application by 30 per cent below 2020 levels by 2030, is of significant concern to grains and oilseeds farmers as they search to understand how such an aggressive target can be achieved within seven growing seasons without impacting yields, the viability of farming into the future, or Canada's ability to retain a competitive position in providing domestic and global food security.

While the Government of Canada may not *imminently* intend to take a hard regulatory approach to this target, farmers have not been consulted on setting, what seems to be an arbitrary and unachievable target, in advance of collaboratively defining a viable pathway that is economically sound for producers - while achieving emission reduction goals. In the absence of meaningful dialogue and communication, farmers are anxious. The communication farmers are receiving regarding the target seems to set a penalizing tone, while undermining the advancements and progress that has been made to improve nutrient use efficiency on farms for several decades, alongside improvements to productivity.

Further, farmers seek clarity and ask the Government of Canada to reconcile its vision for the agricultural sector. For the last several years, with the release of the 'Barton Report' in 2017, the Government of Canada has been supporting an ambitious target to grow Canada's agri-food exports from $55 billion in 2015 to at least $75 billion by 2025. Throughout the pandemic and the Russia/Ukraine conflict there have been further pressures put on farmers to maintain or increase food production to ensure domestic and global food security. These growth objectives seem contradicted by the emission reduction target and farmers are expected to now shift gears for the agenda of the day – climate change – with little dialogue around how these objectives can be simultaneously achieved.

Farmers are willing to continue to be a part of the solution to address climate change and maximize nutrient use efficiency, particularly since fertilizer is one of the most significant costs on farm and they are most exposed to the impacts and risks of climate change predictions of increased frequency and intensity of weather events. Farmers want to feel that they are a part of the process and not have policies that impact their business management decisions dictated to them.

Without the appropriate methodology, modelling, data and measures of progress in place there is real concern that such a target is premature, and will only set farmers up for failure. What then? An eventual shift to a regulatory approach, as seen in other countries, would be detrimental to Canada's crop sector and is of grave concern.

Please find enclosed further general feedback *directly from farmers* related to the emission reduction target, the process, as well as further direct feedback on the discussion questions that have been posed to farmers within the consultation documents.

The target: voluntary? absolute? baseline? – more questionos than answers

Since the announcement in December of 2020, over two years ago, the lack of details and clarity around the fertilizer emission reduction targets has led to confusion and anxiousness within the sector at large, along the entire value-chain and arguably amongst global customers. Various aspects of the intended target have not been well communicated nor well understood such as: a) the voluntary nature of the target; b) the evidence behind how the target was derived and its achievability; and c) the objective of the target to maximize efficiency and optimize fertilizer use without compromising yield or forcing mandatory reductions of fertilizer.

Neither farmers nor provinces were consulted on what could be achievable for the sector in advance of setting a national target. In order to make any progress towards this ambitious goal it will clearly require a collaborative approach, one that farmers feel has not been taken to date. Setting a target in advance of discussing and defining potential, viable pathways has fueled confusion and fear in the sector.

The intended voluntary nature of the target is not well understood. There has been a cloud of uncertainty related to the intention of the target – it has been characterized by third parties as a ban, an absolute fertilizer use reduction and a sister policy to what is being implemented in the European Union's Farm to Fork strategy. **Farmers deserve clarity and significant improvement in communications.**

Intensity vs. absolute

While the discussion document released in March of this year has sought to provide further clarity, **the distinction between fertilizer greenhouse gas emissions and overall fertilizer use is imperative.** Farmers can be onboard with working to find ways to reduce emissions knowing that they are NOT being asked to reduce absolute fertilizer use, which would have a dramatic impact on yields and business economics. While there is some acknowledgement that fertilizer use grows alongside increases in productivity, absolute increases in fertilizer use across the crop sector have to be taken in a broader context of agricultural production in Canada. Growing demand in conjunction with economic pressures has propelled farms to increase output while maintaining or shrinking land use[i] thus improving productivity.

Agricultural productivity of major field crops in Canada has increased by about 34 per cent since 2005 by farmers adapting to producing more with less and adoption of new, innovative technologies[ii] this has naturally increased absolute fertilizer usage in support of increased crop yields; however, has had the opposite effect on emissions intensity (i.e. emissions to produce a bushel of crop). Using an emissions intensity approach is imperative to allow farmers to continue to improve productivity (amount produced per acre) to meet growth pressures while still allowing them to reduce the intensity of production. It has been estimated that a 30 per cent absolute emission reduction for a farmer with 1000 acres of wheat, stands to have their profit reduced by approximately $38, 000 - $40, 500 annually[iii].

Further to this we are concerned with the representation of data related to cereals emission intensities depicted in the discussion document. It is imperative that variables as noted in the document reflect the variation in the composition of cereal production across countries and that Canada is developing its own calculations and baselines. **Alberta wheat and barley farmers would like to reiterate a need to focus on emissions intensity over absolute emission reductions in order to mitigate the negative impacts on farmers' growth and the economy.**

Baselines and data measurements

The target sets a baseline year of 2020. Farmers are concerned that setting 2020 as a baseline will not take into account the gains made in efficient nutrient management to date. This in effect penalizes early adopters of practices and technologies that have made real gains toward improved nutrient management and emissions reductions. Further, without clearly accounting for practice improvement prior to 2020 will make it difficult to clearly measure what actions farmers have taken on their own and where opportunities still exist to make room for improvement. Like in other sectors, farmers have voluntarily made improvements such that many of the near-term changes and opportunities or 'quick wins' have already been adopted (i.e. conservation cropping in Alberta no longer considered an 'additional' practice under the Technology, Innovation and Emission Reduction (TIER) system and also continuous adoption of other BMP's such as spring fertilizing, banding fertilizer, reduced tillage and adopting more efficient varieties that in and of themselves reduce emissions due to them increasing land use efficiency as well as water, nutrient labour and equipment efficiencies.

There are significant issues with data, measurements and methodologies associated with measuring N20 emissions. The existing Canadian model lacks accountability of the mitigation efforts promoted as short-term BMPs within the discussion document. In order to effectively measure progress toward a national emission reduction target it is imperative that there is updated and comprehensive methodology. **The government needs to ensure that any targeted practices have the ability to be accounted for within the national methodology and therefore able to be reflected in the National Inventory Reports (NIR)**[iv]. For example, work is underway to modernize the nitrous oxide emission reduction (NERP) offset protocol in Alberta and could be an effective way to incentivize farmers for practice adoption (related to 4R); however, any emission reductions potentially achieved through this type of initiative would not account toward the emission reduction target because the methodology or co-efficient for the practices that make up the NERP protocol are not developed and thus not included in the national methodology (NIR).

AAFC's own staff have indicated that it could take at least two years or more to develop the appropriate methodology and modelling to understand adoption rates of BMPs, their verified impact on emission reductions and the ability to account for farmers practices toward emission reductions and the target set. That further puts pressure on farmers to make significant changes in a very short period of time – closer to five growing seasons in order for practice adoption to be counted toward the target. This is a significant concern.

Whole-farm, whole of industry approach

Understanding that the Green Agricultural Plan currently in development seeks to provide an integrated approach to addressing agri-environmental issues in the sector, the national target related to emission reductions only focuses on a singular metric related to GHG emissions and doesn't take into account a 'whole farm/whole sector carbon balance' measuring sinks and sources. For example, in Alberta between the period of 1985-2016 the net GHG balance in the crop sector resulted in a cumulative net sink of more than 86.172 MtCO2eq[v]. Voluntary practices adopted by farmers have resulted in increasing the GHG sink in Alberta so that they outstrip the emissions from the sector over the same period. **Farmers need to understand how the soil carbon sequestration that they have achieved on their farms due to continuous improvement will be accounted for within emission reduction targets and measurables**.

Further, farmers need to understand how the investments they have long made in research (through levy payments) related to best practices in fertility management, so that their production methods minimize input requirement s while, while maximizing outputs and in turn reducing emissions and carbon footprint, are being accounted for in total emissions reductions, past and present? This type of research has been a priority for farmers since losses of expensive nitrogen fertilizer as nitrous oxide to the atmosphere represent a financial loss. Farmers have long aimed to reduce fertilizer use, through millions of dollars of investments into research to allow crops/varieties to for example to utilize nitrogen more efficiently or in the modification of genetics to allow the plant to fix its own nitrogen. At present the Alberta Wheat and Barley Commissions are investing over $1.6 million alone in projects aimed at limiting loss, stabilizing and enhancing nitrogen management.

Lastly, the focus of the target as a policy driver on primary production doesn't seem to take a whole of industry approach to incentivize other value chain stakeholders for instance those who produce synthetic fertilizer products. In other industries, we see policies such as End User Responsibility that put an onus on producers of environmentally sensitive products. There needs to be a whole of sector approach and a concerted, integrated effort to meet these targets. Primary producers should not be exclusively targeted.

Tailored approach, based on agroecological zones

The discussion document acknowledges that there is a high degree of uncertainty in setting and achieving a national target due to complexities resulting from incomplete data and also a large number of variables related to different crop types, regional variations, fluctuations in growing conditions from one season to the next and other various factors. Farmers understand this better than anyone as they can see significant variation in one field to the next. In developing any programs or initiatives to support farmers in helping to achieve the emission reduction goals it is imperative that there is a clear understanding of the ineffectiveness of one-size-fits-all approach. Any success toward making meaningful emission reduction targets will be driven by a highly regionalized approach with input from farmers and provincial governments who have the best understanding of local weather, soil type, fertilizer usage patterns and other farm characteristics that have the potential to reduce costs and increase yields.

As per the example above related to net GHG balances, it is imperative that a highly regional lens is put on achieving emission reductions and flexibility and adaptability to specific localized variables be considered.

Economic impact

While within the discussion document the Government of Canada refers to: *the defining challenge of Canadian agriculture in the 21st century to be reducing GHG emissions, to ultimately reach net-zero by 2050, while finding ways to increase yields and economic growth – all while feeding a growing population.* Nonetheless, the document demonstrates a lack of consideration of the economic implications to farmers. Some of this has been detailed above, but for instance in the matrix presented in Table 2: Near term (by 2030) implementation of BMPs to reduce N20 emissions from fertilizer application in Canada, there is no analysis presented related to the potential or feasibility of adoption of BMPs related to the return on investment to the farmer or percentage change to yield.

In alignment with the need to tailor a regionalized approach to practices/programs a regional approach is also needed to look at the regional differences in cost per tonne of CO2 emission reductions. A recent Fertilizer Canada study showed large regional differences between the semi-arid prairies and Ontario in achieving reductions which creates inequity between farmers across Canada. Further, the study suggested that with respect to cost and risk of BMP adoption there is likely to be a significant gap between the cost to farmers and returns to them which will undercut the profitability of Canadian crop production. Many of the proposed BMPs have unproven or limited financial benefit to producers when looking across different agroecological zones. For example, and as also presented in the discussion document, while enhanced efficiency fertilizers (EEF) in some instances have a high potential for reducing N20 emissions without negatively impacting yield or other production measures, it has no demonstrated agronomic benefit to farmers and has a significant cost to farmers.

Rough calculations for the adoption of EEF show between $7.00 - $30.47 per acre of additional costs to famers, the discussion paper also notes an estimated cost of $74 per hectare on average for the use of EEF on wheat in the Prairies.

Economic analysis that either points to a positive yield change or a reduction in costs associated with fertilizer use is imperative to garnering farmer support for emission reduction pathways. Even with the commitment of the Government of Canada to offer supports, most western Canadian farmers are hesitant to rely on Government programs and want to see the business case – either financially or agronomically – to making any on farm practice changes.

Practices are adopted in farm business when they make business sense. Losing fertilizer to the environment does not make business sense as that fertilizer is not being used by the crop. This stands true up to a certain point where the cost of implementation of practice to reduce emissions and/or increase yield is not worth the incremental change. This is where investment in technology and understanding of increasing the impact of the changes or discovering new changes may shift the value proposition and make practices worth investing in on a farm level. Rather than impose unproven practices across a wide swath of farmers.

Lastly, economic analysis should also consider the cumulative effects of other policies and market conditions impacting farmers. An isolated economic analysis may produce a seemingly reasonable result but when taken together, there should be consideration of mounting pressures and costs on farm operations particularly as the average age of farmers increases and they prepare to pass their operations on to the next generation. The average farm in Canada incurs 83 cents in expenses for every dollar of revenue[vi], adding to these expenses will not make it viable for the transition of farms to younger generations nor new entrants to the sector.

Recommendations:

- **Based on emission intensity** - Any such national emission reduction target must be based on emission intensity and consider emissions per unit of crop production to maintain growth; rather than absolute emissions which will have severe consequences to competitiveness of farmers.

- **Communications** - Significantly improve communication to farmers regarding the objective of the target and its voluntary nature. Seek broad and frequent input from the agricultural community to define pathways toward achieving the goal that makes sense on farm. Clear communication on what is being measured and how.

- **Keep the target voluntary and flexible** – Given the data gaps and variability across all regions and with the sector, it is imperative that the target remain voluntary and work with provincial governments and producer organizations to define the goals in the provincial context allowing flexibility in attempting to meet the goal.

- **Past and current practices -** Farmers need to understand how the soil carbon sequestration that they have achieved on their farms due to continuous improvement and voluntary adoption of various practices will be accounted for within emission reduction targets and how past and present practices are acknowledged, including research investments**.**

- **Methodology and Measures -** The government needs to ensure that any targeted practices have the ability to be accounted for within the national methodology and therefore able to be reflected in the National Inventory Reports (NIR) and are considered toward the reduction target.

- **Regionality based on agroecological zones -** As per the example above related to net GHG balances, it is imperative that a highly regional lens is put on achieving emission reductions and flexibility and adaptability to specific localized variables be considered**.**

Discussion Questions:

In an informal survey of our farmer members, we have seen that the following GHG reducing practices have the highest perceived value on their farm:

- Applying N in the spring rather than the fall
- Annual soil N test for spring fertilizer application
- Variable rate technology (varying rate within a field)
- Sectional control technology

On the basis of these practices and our informal survey we are providing the following feedback on the discussion questions.

What are the biggest barriers to adoption of practices that reduce emissions from fertilizer application and how can these be overcome?

- **Proven Return** - Education and knowledge transfer related to economic outcomes/returns (yield or cost saving) as well as providing reliable information to de-risk a specific practice prior to adoption. Adding costs without a proven return is not feasible on most operations (i.e. EEF) returns are accounted for in the payment for new equipment (i.e. sectional control). Costs may be prohibitive for smaller operations. Costs to upgrade existing technology or make up-front investments can be prohibitive against capital and return (i.e., sectional control)

- **Time pressure** – weather and in some instances (i.e., Peace River area of Alberta) the short growing season doesn't allow for the adoption of additional practices when farmers are focused on short seeding and harvest timelines or when either is interrupted by an unexpected weather event – i.e. cover crops, spring application of N. For fertigation it can also be too wet to apply and you miss the appropriate timing. Practice doesn't always make sense with crop timing (i.e., split application of N is dependent on leaf stage).

- **Logistics –** storage capabilities i.e., not all farms have the ability to purchase fertilizer (better price in the fall) and store for spring application. Supply chain and transportation issues. Often (especially recently) the availability of equipment is a barrier. Reliability of broadband connectivity is another barrier related to logistics if the unit (i.e., sectional control) stops communicating the equipment is down. Often compatibility issues between technologies.

- **Training and labour** – having the personal knowledge or training to use the technology or personal or contact with an agronomist that can help with variable rate expertise, as well as training others (laborers) on the technology.

- **Lack of alternatives** – for instance, fertigation requires liquid fertilizer which is more expensive. Also requires a specific technology which is more costly. The technology is not always available.

- **Regulation** – controlled tile drainage and irrigation are subject to red tape and exhaustive regulatory processes (some provincial and some federal).

What steps can be taken to increased adoption of practices of the use of new, enhanced efficiency fertilizer products that hold the potential to reduce emissions from fertilizer application

As previously described, there is a significant cost to producers to purchase and use EEF products, with little shown agronomic benefit. There is a need for improved data to show the benefit and return on investment to an operation beyond GHG reduction potential. Field trials are a good way for farmers to trial the use of EEF and would benefit from a program or support to do this.

Farmers are charged for this product at the retail level and cannot pass these costs on – as a price taker in a trade exposed market. EEFs may not be widely available at all retail locations. Like other BMPs EEFs are not suitable in all situations and cannot always be substituted. In some cases, farmers would require upgrades to machinery to be able to place EEFs at the depth required.

Lastly, there is a lack of confidence that adoption of this practice will be recognized by the government and that the ability to measure (i.e. NIR methodology) exists to reflect this (and other practices) in the emissions reduction calculations. Programs like OFCAF and ACS Living Labs could help support reducing these barriers to adoption. However, OFCAF funding at present would allow for a small percentage of participation from farmers in accessing these funds toward EEF. Policies directed toward manufacturers could help drive costs down and share the responsibilities for emission reductions across the value-chain.

In addition to the existing programs, how can government best work with industry and producers to mobilize increased adoption of emissions-reducing practices? What are the appropriate roles for agriculture sector, governments and other partners and stakeholders in meeting this target?

Programs like the Agricultural Climate Solutions – Living Labs, that the Alberta Wheat and Barley Commissions is supporting in Alberta, help to provide the in-field data that can help farmers make business management decisions and prove agronomic benefit to the adoption of specific practices.

Farmers want to be directly engaged in helping design programs so that they are targeted in identifying focused practices that provide the best benefit to both their operations and to the emission- reducing potential. Engagement with the provincial governments is critical as well, as they best understand the regional factors that must be considered in developing meaningful responses.

Government should take an incentive-based approach to developing programs. Things that can be explored are tax incentives, increased investment in plant-based research, and playing a bigger role in education and extension. The announcement of a national emission reduction target with little consultation from farmers has left farmers feeling penalized rather than applauded for their past and continuing efforts that have significantly reduced the intensity of emissions from fertilizer over the past decades. Farmers want the Government to be an advocate and a champion for the sector, rather than feel villainized. There is a willingness to work together but farmers need to feel that the tone indicates that there is a pulling in the same direction rather than working against them.

As mentioned above, taking an integrated approach to reducing emissions is helpful. Farmers want to be acknowledged for the carbon sequestration capacity that they have built on their farms through the adoption of practices that enhance their soil organic carbon potential that increases sequestration of carbon.

Defining clear measures and methodologies related to how emission reductions will be accounted for is critical to moving forward.

How can important data on the changes in emissions from fertilizer application be more consistently and comprehensively collected, analyzed and reported?

First, these methodologies and measures should be well established prior to setting a target. As discussed above, it is of significant concern that programs, funding and policies are being developed directed toward farmers and asking them to reduce emissions when most practice change at this point just simply cannot be accounted for under the current methodology.

With respect to data collection, there could be an opportunity to use the Business Risk Management administrators, some of whom are already collecting data to this end, as a way of garnering a better understanding of practices being adopted by farmers. In Alberta, for example, enrollment in AgriInsurance covers over 80 percent of the sector and could help fill in existing data gaps related to current practices.

The Agricultural Climate Solutions 'Living Lab' program is also a good start on collecting data toward developing the appropriate methodology to measure changes in emissions. The Alberta Wheat and Barley Commissions were early collaborators on a crop/livestock application (and recent approval) to the program.

Working with and providing resources to provinces to help them employ resources and play a role in comprehensively collecting, analyzing and reporting on changes in emissions, this will also allow for a more regionalized approach to data interpretation.

What would be the most effective way for Government and industry to work together in partnership to collect and make public detailed fertilizer use and 4-R data to better understand areas where there has been success, or opportunities for improvement?

From between 2014 and 2021 Fertilizer Canada in collaboration with various organizations representing farmers across Canada, including the Alberta Wheat Commission, have been conducting a Fertilizer Use Survey to gather data on fertilizer management practices and current knowledge of 4R Nutrient Stewardship from farmers across Canada. The survey also captures baseline data from a number of commodities (ie. winter wheat, spring wheat). The survey has led to a better understanding on the current state of fertilizer management in Canadian crop production and how farmers use and make decisions about fertilizer application.

Farmer directed groups, like the Alberta Wheat Commission provide funding toward the farmer-directed survey. This is a survey farmer are familiar with and being industry led tends to have a higher response rate and a clearer interpretation of the data. AAFC support/funding into collecting this useful information would be very useful in order to ensure alignment on data outcomes and in order to expand the sample number of farmers surveyed to provide a more robust data set.

What considerations need to be taken into account to ensure better and more accurate reporting of farm-level data while minimizing the reporting burden at the individual farm level?

Opportunities could exist in software and application development that can help farmers streamline the use and interpretation of their on-farm data. There is a lot of data being collected but can be difficult, expensive and timely to manage the data that is being collected.

What is the best way for governments and industry to support the emergence of new an innovative solution to address climate goals, such as emissions reductions?

Policy drivers have to also be directed toward the entire value chain – the targets as suggested are singularly focused on primary production –which may eventually spur enhanced innovation but there is a need to integrate policies comprehensively in order to encourage innovation and its subsequent adoption. With respect to adoption, it harkens back to providing education and extension to farmers on the return on investment and to help with adoption, particularly for smaller farms who don't necessarily have the capital to make these additional types of investment.

Are there opportunities not listed in the discussion document that you think should be considered as potential pathways for achieving emissions reduction targets for both 2030 and 2050?

Alberta Wheat and Barley Commissions are members of the Grain Growers of Canada and are supportive of the process to build a framework, Roadmap to 2050, to better understand potential pathways for achieving emissions reduction targets. A comprehensive analysis is required to best identify pathways that at the forefront provide value on farm (return on investment, yield/productivity increases). We look forward to providing you further feedback on opportunities and pathways to achieve emissions reductions as we work through this process.

We thank you for your consideration of the feedback of the Alberta Wheat and Barley Commissions. Please contact Shannon Sereda, Sr. Manager, Government Relations and Policy ssereda@albertawheatbarley.com or at 587-899-5299 with any questions.

Sincerely,

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[i] From Simpson Centre paper (statistics Canada, 2022a): https://www.simpsoncentre.ca/wp-content/uploads/2022/06/Near-Term-Nitrous-Oxide-Reduction-Options.pdf
[ii] https://fertilizercanada.ca/wp-content/uploads/2021/05/Emissions-Reduction-Initiative-Impacts-Solutions.pdf
[iii] https://fertilizercanada.ca/wp-content/uploads/2021/05/Emissions-Reduction-Initiative-Impacts-Solutions.pdf
[iv] Simpson Centre Report: https://www.simpsoncentre.ca/wp-content/uploads/2022/04/Global-Agricultural-GHG-Emissions-Direct-Fertilizer-Based-Emissions-03.2022.pdf
[v] https://www.biologicalcarbon.ca/wp-content/uploads/2020/01/BCC_AssessingGHGSourcesSinks.pdf
[vi] Canada's 2021 Census of Agriculture