INCLUDING HUMALITE IN CANADA'S AGRICULTURAL EMISSION REDUCTION SOLUTION

DESCRIPTION

According to a recent MNP Report; "Under Canada's Strengthened Climate Plan, the government of Canada is envisioning a 30% reduction in absolute emissions by the year 2030. That would include chemical fertilizer reductions used in crop production by Canadian farmers to achieve their part" in reduced emissions. To understand the reduction needed in fertilizer *use* to achieve the 30% *emission* reduction goal MNP uses "the model proposed under the EU Green Deal which cites an actual reduction of 20% in fertilizer use compared to 2020 levels".[1] Urgent, creative, and balanced solutions are required to ensure agricultural economic sustainability and that crop yields are maximized to feed Canadians and the growing world population. Humalite, should be supported as a soil and foliage enhancer, and it may be a perfect solution to reduce GHG (greenhouse gas) emissions while working to maximize crop yield.

BACKGROUND

Climate change is among the most pressing issues on the world's agenda today. Climate change combines with geopolitical strife, global food security issues, and economic challenges to make a particularly challenging time in the world's history. Major action is being taken on many fronts to address climate change, including food production; however, creative solutions are required to balance any net negative impacts on other areas, such as agriculture productivity which can contribute further to food security and economic success.

In Canada, the Federal Government has "committed to set a national fertilizer emission reduction target of 30% below 2020 levels by 2030"[2.] This ambitious target has been criticized as high nitrogen-based fertilizer is common in today's farming methods to maximize crop yields.

The Canadian Federation of Independent Business (CFIB) August 2022 Business Barometer data revealed that the agricultural industry had the most negative short and long-term outlook among all sectors in Canada. 60% of respondents stated that a mandatory emissions reduction "would decrease the profitability of their agri-business", while 42% reported "it would be challenging as they have already reduced their nitrogen fertilizer use". Research from CFIB shows that Canadian farmers "have already adopted or plan to adopt best practices to manage or reduce nitrogen emissions."[3]

Referring back to the recent study from MNP, a 20% reduction in fertilizer can be used as a number to model a 30% reduction in carbon emissions. To determine the effects of this reduction on farmers, MNP analyzed the financial impact of lost production in corn, canola, and spring wheat. In their model, MNP estimated by 2030 that "given constant prices, the total value of lost production grows to $10.4 billion per year by 2030 and across the years 2023 to 2030 is shown for each crop as follows:"[1]

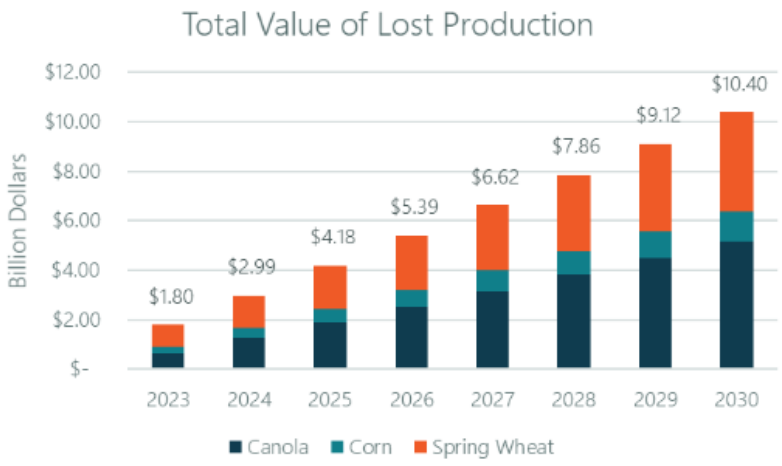

TABLE 1; MNP, 2021.

This loss is concerning not only because of lost revenues to crop farmers, but because of the resulting decline in food production. The World Bank's Food Security Update from December 5th notes that "domestic food price inflation remains high around the world... The share of high-income countries with high food price inflation has risen to 85.5%."[4] With food inflationary pressures, and general food security issues, maintaining good crop yield is particularly important, just the same as it is essential that GHG emissions are reduced. We need a solution that accounts for both the environmental and agribusiness sides of the equation.

SOLUTION

There are four classes of coal: "anthracite, bituminous, subbituminous and lignite."[5] Lignite coal is a "low rank" coal that has "lower calorific values" than the other three kinds of coal, "however, it is rich in organic matter (OM) and humic substances (HS, or "humic") (Liem, 2021)."[6] One form of low-rank coal is called "humalite," that can be used in agriculture in forms like humic acid and liquid fulvic acid. Humalite can be useful in agriculture for soil enhancement and fulvic applications, while paired with a reduced amount of fertilizer, and has produced the best results in poor soil conditions. Humic substances have been recognized by the Canadian Food Inspection Agency (CFIA)[7] as well as the US Department of Agriculture (USDA) National Organic Program (NOP)[8.] Humalite can be sourced right here in Canada, from places such as Hanna, Alberta.[9]

A recently published textbook "Low-Rank Coal Applications in Agriculture" explains important work that has been done with humalite in agriculture. In one study that was completed in Alberta in 2018, liquid fulvic acid (FA) was tested at a single or doubled rate in conjunction with fertilizer nutrients at either 33% or 100% rates[6]. A control group of 0%, 33%, and 100% nutrients, not paired with any humic substances was also used as a test control. Five applications of each treatment were performed, and the results when analyzed concluded that "only when liquid FA was applied to 33% nutrients were significant yield improvements recorded. This indicated that 100% nutrients were already more than adequate for this application and so liquid FA did not help to increase crop yields." This experiment demonstrated that

"liquid FA applied foliar to seedlings at small application rates enhanced yields of barley," and that lower rates of nutrients combined with humic substances produced better yields. This favourable result would meet the government emission reduction requirements while allowing the producer to maintain or increase crop productivity.

The results also showed better economic performance, with a net revenue increase of $18.38/ha moving from Control 1 to Treatment 1-2, and a net revenue increase of $34.04/ha moving from Control 1 to Treatment 1-1. Table 1 below lays out the experiment, and Table 2 shows the results:

Table 6.22 Experimental protocol.

Treatment	Plot size m^2	Nutrients (4-16-5)		Liquid FA		
		Rate	l/ha	Rate	ml/ha	#
Control 0	1.8 m × 6.7 m (= 12.1 m^2)	0%	0.0			
Control 1		33%	2.3	FA0	0	
Control 2		100%	7.0			
Treated 1-1		33%	2.3	FA1	70	5
Treated 2-1		100%	7.0			
Treated 1-2		33%	2.3	FA2	140	
Treated 2-2		100%	7.0			

Note: # = number of replications.

TABLE 2; LIEM, 2021

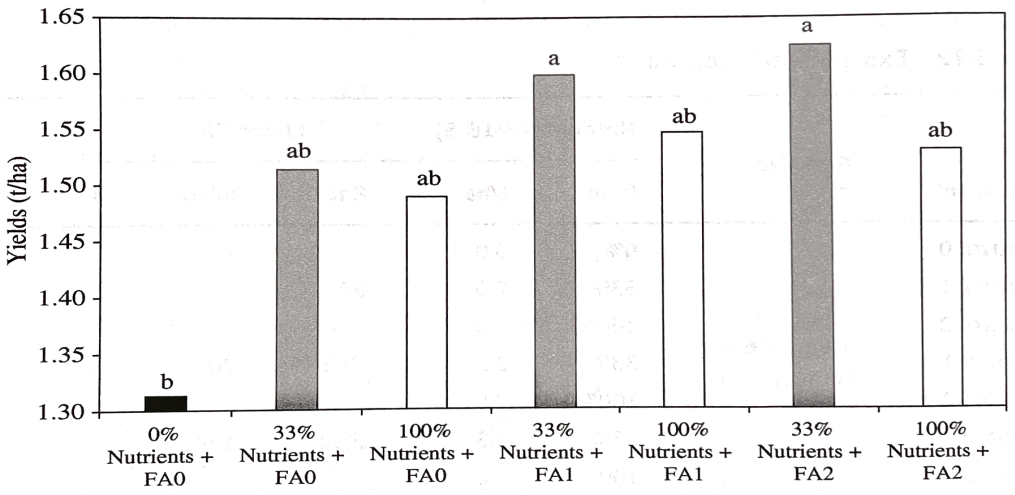

Figure 6.18 Treatment vs. yields.

TABLE 3; LIEM, 2021

The results of this experiment shows promising results for humalite use in agriculture. While coal has fallen out of public favour in recent times due to its high-carbon emissions as a fuel source, governments and industry must recognize that there can be alternative clean uses for coal, such as low-rank coal in agriculture.

RECOMMENDATIONS

The Sherwood Park & District Chamber of Commerce recommends that the provincial government work with the federal government, farmers, and other relevant industry stakeholders including Indigenous partners to:

1. Support and promote the research, production, domestic use, and export of environmentally friendly Humalite products, including raw materials/products that are mined/manufactured in Alberta, for agricultural use;
2. Ensure that any fertilizer emission reduction plan includes a strategy to maintain and maximize crop yield, including the use of Humalite.

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