

USING MANURE IN CROPPING SYSTEMS

MONETIZING THE VALUE OF MANURE

Shawn Parish, whose 1600-acre farm in Uxbridge, Ontario receives manure from their dairy operation, considers the economics of making their manure program work from a few perspectives:

“ For us, getting the most value out of the manure means making sure the manure goes onto the corn ground first because corn ground uses the most nutrients and is the most expensive to grow. We don't transport the manure too far as it is hard on the equipment. Our manure isn't 'free', but we do consider it a bonus.”
| Parish

A report from the Greenbelt Foundation found that the 'bonus' factor of manure – i.e. the economic value of soil health benefits - has been insufficiently quantified or documented in Ontario-specific research. In other words, it is an area of research where we still need more information gathered and analyzed.

WE KNOW NUTRIENT VALUE

The nutrient value of manure is well understood. The nitrogen (N), phosphorus (P) and potassium (K) values of different types of livestock manure is well-documented in an Ontario database built from 1000s of manure samples. This gives Ontario growers the ability to estimate N, P and K values of their manure to build a fertility program for their cropping systems.

Some growers see the value of manure in the fertilizer off-set value and in the gains in agronomic productivity. *“On the land that has a history of manure application, we always apply less fertilizer. Not only do we get the best yields - like, by a lot - from that manured ground, but we also save on fertilizer. And that double win leaves extra money in my pocket”*, says Parish.



Shawn Parish with daughter, Parbro Farms near Uxbridge, Ontario.

Considering the “bonus” value of manure

Manure amendments build soil health by:

- increasing soil organic matter (i.e., soil carbon)
- increasing micronutrient levels
- increasing microbial diversity

These changes results in:

- soil being more workable
- better soil conditions for crop growth
- more drought tolerant crops

HOW FAR TO HAUL?

The report by the Greenbelt Foundation compared the “break-even” cost of manure application vs. fertilizer based on meeting N-recommendation rates for corn.

In this scenario, break-even transportation distances depended on manure type, cost of fertilizer and cost of fuel. Solid poultry manure – the manure with the highest N density – can be transported as far as 160 km when N-fertilizer costs are high (2021/22 values). When fertilizer costs are lower, break-even transportation distances are calculated to be 55 km. Transportation distances for beef, dairy and hog manure are also shown in Table 1.

WHAT’S THE BOTTOM LINE?

Table 1: The calculated “break-even” transportation distances of manure considering different manure types and two different fertilizer cost scenarios; both manure and fertilizer rates are based on Ontario corn recommendations.

Manure Type	Hog	Dairy	Beef	Poultry
	(Liquid 1000gal/ac)		(Solid ton/ac)	
Application Rate	5	10	20	5
Total N (lb/ac)	160	160	160	175
Total P (lb/ac)	120	120	220	220
Total K (lb/ac)	120	210	270	150
Application Cost (\$/ac)*	\$80	\$110	\$80	\$20
	2021/2022 Fertilizer costs			
N Equivalent Value (\$/ac)	\$200	\$195	\$195	\$215
Net Return (\$/ac)	\$115	\$85	\$115	\$195
Break-Even Transportation Distance	20km	10km	25km	160km
	2020/2021 Fertilizer Costs			
N Equivalent Value (\$/ac)	\$80	\$80	\$80	\$90
Net Return (\$/ac)	-\$5	-\$30	-\$5	\$65
Break-Even Transportation Distance	0	0	0	55km

*Assuming the price of manure is \$0 and custom manure application rates (OMAFRA, 2018) to meet crop N needs.

Additional resources:

Towards a Business Case for Soil Health: A Synthesis of Current Knowledge on the Economics of Soil Health Practices in Ontario. 2022. The Greenbelt Foundation. www.greenbelt.ca/business_case_soil_health

For all OMAFRA's Best Management Practices Resources, including Manure Management, Cover Crops and Manure Application, and Adding Organic Amendments, go to: bmpbooks.com

The New AgriSuite. The Ontario government's free agricultural and environmental suite of decision support tools related to crop management, nutrient management and minimum distance separation. <https://agrisuite.omafr.gov.on.ca/>

Possible funding programs to support equipment modifications, purchase, new practices, etc., consult:

- Your local Conservation Authority
- OMAFRA Programs
- Ontario Soil and Crop Improvement Association, or your local Soil and Crop Group



Pro Tips:

Don't go alone: Find others who use manure as part of their fertility and soil health program. They can help problem-solve, access existing resources, and help you gain confidence.

Start Small: Before investing in your own equipment, find a custom operator that supports your farm goals and workplan (e.g. won't apply when soil conditions are unsuitable and are compliant with existing regulations).

Tap into incentive programs: Use available funding to offset new costs, including purchasing or modifying application equipment or in-line sensor systems.

Track the impact: Use soil tests every 3 to 4 years to keep an eye on phosphorus and potassium levels where manure is applied. Monitor earthworm activity. Use OMAFRA's **AgriSuite** to support fertility rate adjustments.

Consider an on-farm research project: Try connecting with your local conservation authority, Soil and Crop Improvement Association, or research institution to have support tracking the results. Your farm's use of manure can help add to the growing body of knowledge around manure use and impact on soil health, crop response, and economic viability.

This factsheet is a summary of key findings from the report, *Towards a Business Case for Soil Health*. Soil health practices considered in the report and this Factsheet Series are: reduced tillage, cover crops, crop rotation, manure amendments, rotational grazing and various 4R nutrient practices. The report estimated that Ontario farm net returns would increase by approximately \$14.6 million dollars per year if an additional 10% of the agricultural land in Ontario were to be managed to support soil health.

The numbers come from peer-reviewed, Ontario-based research and the analysis is based on financially-representative, farm-level budgeting techniques for Southern Ontario. Estimates are conservative and do not represent profits possible with experienced management.