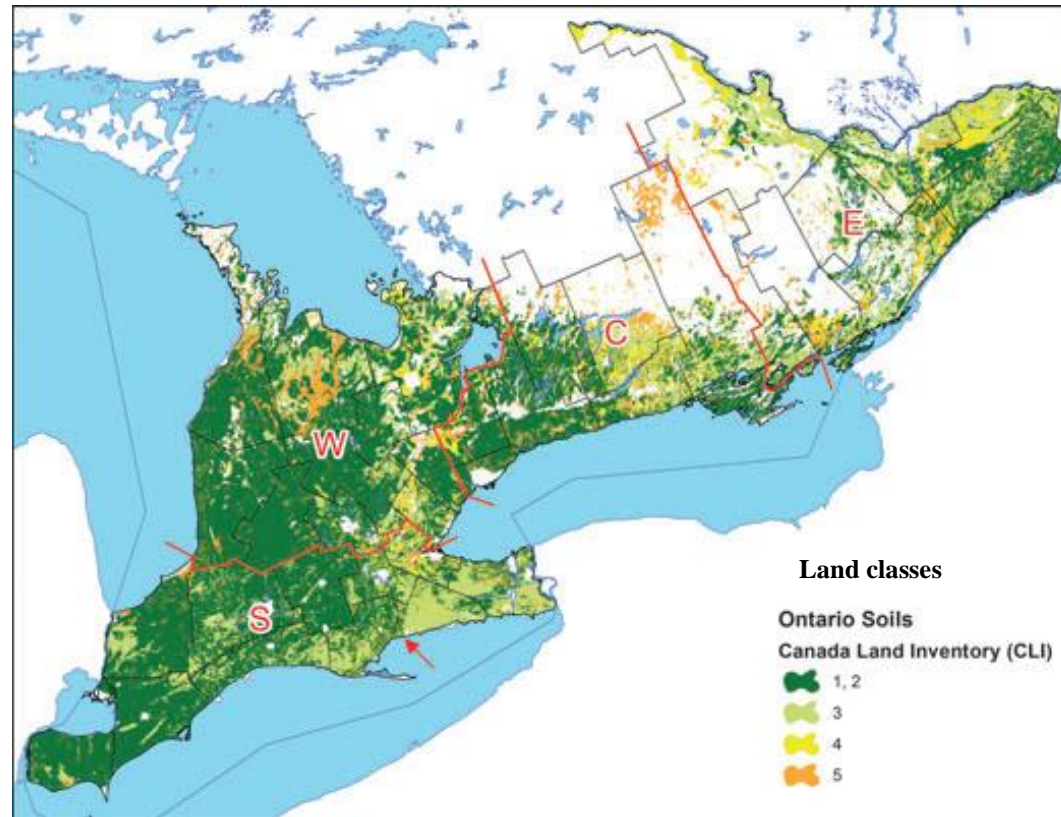# Supporting Information (SI)

SI-1. Regions of Ontario and land classes.

(S: Southern Ontario; W: Western Ontario; C: Central Ontario; E: Eastern Ontario) (source: Sanscartier et al., 2013).

SI-2. Land classification in Ontario (AAFC, 2008; OMAF, 2013).

Classification	Descriptions
Class 1	Well developed and has no significant limitations in use for crops.
Class 2	Has moderate limitations that restrict the range of crops or requires moderate conservation practices.
Class 3	Has moderately severe limitations that restrict the range of crops or requires special conservation practices.
Class 4	Has severe limitations that restrict the choices of crops or requires special conservation and management practices, or both.
Class 5	Has very severe limitations that restrict their capability in producing perennial forage crops, and improvement practices are feasible.
Class 6	Unsuitable for cultivation, and can be used for unimproved permanent pasture.
Class 7	Has no capacity of arable culture or permanent pasture.

OMAFRA, 2013. Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario. (http://www.omafra.gov.on.ca/english/landuse/classify.htm#intro).

SI-3. Land classes, soil types and miscanthus yield.

Land class	Description	Soil type	Yield, dry-ton/ha
Class 1	Suitable for field crops	Silt loam-clay loam	11.14
Class 2	Suitable for field crops with moderate limitations	Silt loam-clay loam	11.14
Class 3	Suitable for field crops with moderately severe limitations	Sandy-clay	10.3
Class 4	Has severe limitations for field crops	Sandy-loam	8.9
Class 5	Very severe limitations for field crops	Loam	7.8

Prime land: classes 1, 2 & 3; Marginal land: classes 4&5 (Source: Kludze, et al., 2013)

SI-4. Land area in Ontario, ha (Kludze et al., 2013).

Regions	Land class and tillable land area, ha					
	Class 1	Class 2	Class 3	Class 4	Class 5	Total
Southern Ontario	238102	876664	414109	37138	39332	1605345
Western Ontario	724831	254067	239130	73112	130091	1421231
Central Ontario	165830	113526	122839	118976	84424	605595
Eastern Ontario	32005	312567	304841	148471	65166	863050

Kludze, H., Deen, B., Weersink, A., van Acker, R., Janovicek, K., & De Laporte, A. (2013). Impact of land classification on potential warm season grass biomass production in Ontario, Canada. Canadian Journal of Plant Science, 93(2): 249–260.

SI-5. Estimated emission from farm input and carbon sequestration.

Parameters	CO_2e (g/ODT miscanthus delivered at farmgate)			
Location	Western Ontario	Southern Ontario	Eastern Ontario	Central Ontario
Land class	1–2	3	3	4-5
Soil type	Silt loam - clay loam	Clay	Clay	Loam
Displace crop rotation	Corn-soy rotation	Continuous soybean rotation	Corn-corn-forage-forage rotation	Long term pasture
Emission from farm input	128858.17	149714.94	166284.58	155710.04
Change in C content in all pools	-157434.66	-237784.33	1185.43	11957.97
Net emission	-28576.49	-88069.39	167470.01	167668.00

SI-6. Methodology for calculation of transportation distance (Huang et al., 2009).

Radius of the area, R km = $\{F/(\pi f_a f_{lc} Y)\}^{1/2}$

where, F = Annual feedstock demand, t

π = constant

f_a = fraction of total farmland from which feedstock can be collected or produced

f_{lc} = fraction of surrounding farmland containing crops

Y = biomass yield per unit area (dry), t/km^2

Transportation distance (collection center–processing plant), D km = $2Rf_w/3$

where, f_w = road winding factor (assumed to be 1.3)

Reference

Huang HI, Ramaswamy S, Al-Dajani W, et al. (2009) Effect of biomass species and plant size on cellulosic ethanol: A comparative process and economic analysis. *Biomass Bioenerg* 33: 234–246.