

Making Cents from Amendments

Soil Conservation Council
of Canada
Nov 16, 2021



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Agenda



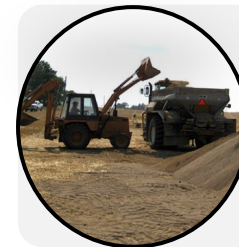
Who is LP Consulting?



Soil Health Status and Climate Change Impact



Fertilizer Market Trends



Soil Amendment Opportunities - ROI

Who is LP Consulting?

**For
Farmers**

**For
Industry**

**For Agri-
economy**



LP CONSULTING



LP Consulting Ltd
902-256-2536



For Industry

We turn industry residuals into renewable resources

- Connect Industry to Agriculture
- ID marketing Opportunities
- CFIA label applications
- Waste Research
- Logistics to trouble shooting
- Carbon Opportunities



Soil Health Status & Climate Change Impact– What do we Know?

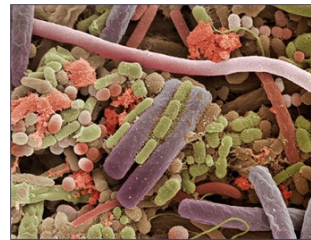
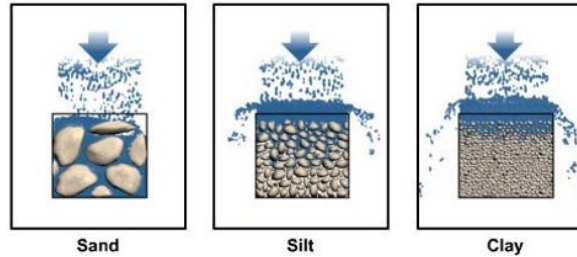
Degraded Soils



- Susceptible to wind, water, bank & tillage erosion
- Poor structure
- Hard pan



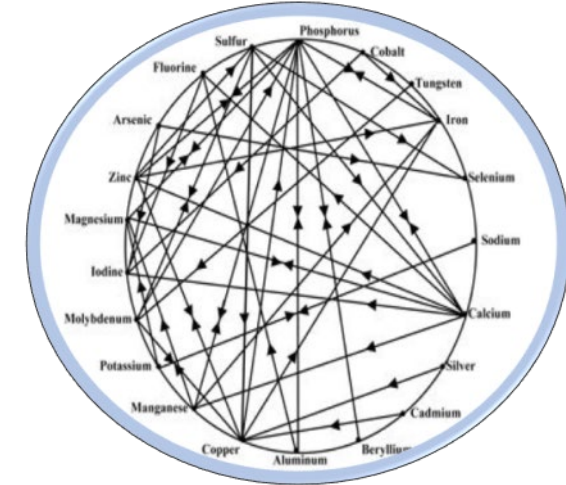
Low Organic Matter



- Reduced microbial activity
- **Poor water retention – 6X**
- Increased soil compaction
- Bigger changes in soil pH
- Reduced nutrient availability



Unbalanced Soils



- Low pH – very low below hard pan
- Low calcium
- High phosphorus
- Imbalanced nutrients
- Poor retention on sandy soils



Climate Change Impacts

On Agriculture

Severe Rainfall Events in Short

Period of Time

Droughty Summers

Wet Spring & Fall

Less Snow Cover

Desertification

Healthy soils important for society

More than just for Food!



Maintain & protect the integrity of one of the province's most valuable and fragile natural resources- **Soil**

Critical to Health of the Planet

- Regulates climate through carbon cycle
- Store water to moderate floods and drought
- Environmental protection:
 - Water quality
 - Air quality
 - Soil quality

Fertilizer Market Trends

Most major nutrients have been in decline since the early 2000's due to global competition which has reduced profit margins while fertilizer and lime input costs have increased.

- Macro – N-P-K
- Supplementary – Ca, Mg, S
- Micro – B, Zn, Fe, Mo, Mn



Where do our fertilizers come from?

Nitrogen (Resource Based – captured from air, natural gas)	Phosphorus (Mined)*	Potassium (mined from salt deposits)
China (36.9 M mt)	China – 41%* 30% of world trade	Canada – largest reserves (Sask)
India (13.7 M mt)	Morocco	Russia #1 MOP producer
US	US	Belarus
Russia	Russia	China
Canada (3.9 M mt)	Jordan	Germany
Indonesia	Brazil	Israel
Qatar	Saudi Arabia	Jordon
Pakistan	Egypt	Chile
Egypt	Israel	Spain
Saudi Arabia	Vietnam	US

2008 – demand

2021 – demand, supply, policy

Opportunities for Organic Residuals



Importance of Amendments for Ag

- Improve soil condition – tilth, aeration, drainage, water holding capacity, reduces hard pan
- Limited availability of phosphorus
- Adds OM
- Stimulates microbial activity
- Sustainable nutrients



World market fertilizer prices can determine the “displacement value” of residual amendments

There are reporting differences between Labs & Tests

Need the Right Test!

	NS Power		Irving		N-Viro		Compost	
Nutrient	kg/tonne	Value\$	kg/tonne	Value\$	kg/tonne	Value\$	kg/tonne	Value\$
Nitrogen	0	\$0.00	0	\$0.00	8	\$11.20	3.6	\$5.04
P205	12	\$20.16	10	\$16.80	10	\$16.80	4.8	\$8.06
K20	25 (60)	\$29.40	29	\$30.45	10	\$10.50	1.2	\$1.26
Lime		\$18.00		\$18.00		\$36.00		\$0.00
Mg %	0	\$68.00	0	\$46.24	3%	\$20.50	0.1%	\$6.80
B %	0.2	\$2.40	0.1	\$1.20	0.10	\$1.20	0.0007	\$0.08
Zn %	1	\$4.50	0.7	\$3.50	0.2	\$0.90	0.01	\$0.45
S %	1	\$9.00	3	\$27.00	3	\$27.00	0.16	\$1.44
Total Value		\$151.46		\$143.19		\$124.10		\$23.13

There is more to amendments than just fertilizer and lime value

Working on putting a \$ value on OM & Microbes



Wood Ash Programs 0-1-3

Wood ash applied to agricultural fields for decades

- Alberta –180,000 t/yr
- Quebec –80,000 t/yr
- Maritimes –600,000 tonnes
CFIA Fertilizer



Avg/tonne
19 lbs P₂O₅
52 lbs K₂O
33 lbs S
18 lbs of Mg
Lime

Nutrient	Brooklyn Power		NS Power		Irving	
	kg/tonne	Value\$	kg/tonne	Value\$	kg/tonne	Value\$
Nitrogen	0	\$0.00	0	\$0.00	0	\$0.00
P205	7	\$11.76	12	\$20.16	7	\$11.76
K20	23	\$24.15	25 (60)	\$29.40	23	\$24.15
Lime		\$18.00		\$18.00		\$18.00
Mg	6	\$41.00	10	\$68.00	9	\$46.24
B	0.2	\$2.40	0.2	\$2.40	0.1	\$1.20
Zn	0.7	\$3.50	1	\$4.50	0.7	\$3.50
S	0.5%	\$4.50	1.0%	\$9.00	3%	\$27.00
Total Value		\$105.31		\$151.46		\$131.85

CFIA Registered

Nutrient	CFIA Label
Potassium (K ₂ O) %	8
Calcium %	29
Magnesium %	0.75
Sulfur %	3

Ag Index (ECCE) 66%:

0.9 tonne of KaLime = 1.0 tonne of AgLime

****but better due to CaO %! CKD***



\$ Value of KaLime (CFIA Label)			
Nutrient	Unit		Value\$
Nitrogen	kg/tonne	0.00	\$0.00
Phosphorus (P ₂ O ₅)	kg/tonne	0.00	\$0.00
Potassium (K ₂ O)	kg/tonne	80.00	\$76.00
Magnesium	%	0.75	\$48.75
Sulfur	%	3.00	\$27.00
AgLime			\$44.00
Value			\$124.75





Avg/tonne:
21 lbs N
27 lbs P₂O₅
70 lbs K₂O
35 lbs S
9 lbs Mg
300 lbs Ca
460 lbs OM
Lime



CFIA

- Increases pH - Calcitic lime (CKD), very soluble, 30-60% CaO
- Nutrients – N,P, K and Micros
- Beneficial micro-organisms
- Organic Matter (400-510 lbs/t)

	Sudbury	Sarnia	Leamington	Niagara
Nutrient	Value\$	Value\$	Value\$	Value\$
Nitrogen	\$11.00	\$9.90	\$11.00	\$8.80
Phosphorus (P ₂ O ₅)	\$10.15	\$15.95	\$8.70	\$20.30
Potassium (K ₂ O)	\$32.30	\$20.90	\$27.55	\$20.90
Calcium	\$54.00	\$54.00	\$54.00	\$54.00
Magnesium	\$32.50	\$32.50	\$32.50	\$32.50
Sulfur	\$15.30	\$13.50	\$13.50	\$17.10
Value/Tonne	\$155.25	\$146.75	147.25	\$153.60

Biosolid Pellets

Nutrient (lbs/tonne)	Nutri-Pel Veolia	
	OMAFRA	CFIA & 2015 SGS - Lasalle
		101/110
Nitrogen	88	61
P205	108	132/180
K20	3	4
Sulfur	21	21
Calcium	64	66
Magnesium	10	11
Organic Matter	1169	1289
C:N	6.6	pH 6.8
\$ value/tonne (N-P-K-Mg-S)	\$120	\$177

Detroit Pellets Lasalle	
OMAFRA	2015 SGS - Lasalle
95 43	110 50
58	70
5	5
ND	17
35	38
7	7
1448	1643
7.6	pH 5.9
\$90	\$104

Windsor Pellets Lasalle	
OMAFRA	2015 SGS - Lasalle
65 29	90 40
67	100
4	2
ND	ND
26	22
7	4
1266	1553
9.7	pH 6.3
\$79	\$111



Organic Matter (OM)

Feeds & Protects



- **Nutrient Bank Account!**
 - Holds nutrients in plant available form
 - **Increases** fertilizer efficiency
- **Reduces** soil compaction
- **Buffers** changes in soil pH
- **Increases aeration** allowing for bigger/stronger plant roots
- **Holds moisture**, water will be deeper in soil therefore crops roots grow deep, drought resistant. **Holds 6x time weight in water**

Microbes “Farm the Soil”

- * Breakdown OM
- * Cycle nutrients
- * Maintain nutrient reservoirs
- * Degrade pollutants
- * Naturally repel disease & insects



Mycorrhizal fungi surround & enter crop roots to provide nutrients & water in exchange for carbohydrates



The more soil microbial activity, the greater the degradation of the briefs.



Can Residuals Fit into Carbon Credit Programs?

Canada - the federal carbon tax is currently \$30 per tonne.

It is scheduled to rise to **\$170 a tonne by 2030.**

Agriculture and Industry

can partner to earn carbon credits

- Mandatory
- Volunteer
- NFT's



Example: Compost

- **5.3 million MT of food waste** is composted into 2.7 million MT of compost.
- An **additional 2.4M MT** of food waste is shipped to landfills. – GHG!
- **Only 2% of food waste** is sold for high value products such as bagging for the large public market.



Canada Compost fertilizer displacement reduces:

- GHG emissions by at least **40,848 tCO₂e** (BEAM Model). This doesn't fully account for:
 - mining and transportation of inorganic fertilizers overseas or
- Over **\$881M** in chemical inorganic fertilizers sourced from China Russia, Morocco and the USA
- adds over **5.6M MT** of organic matter



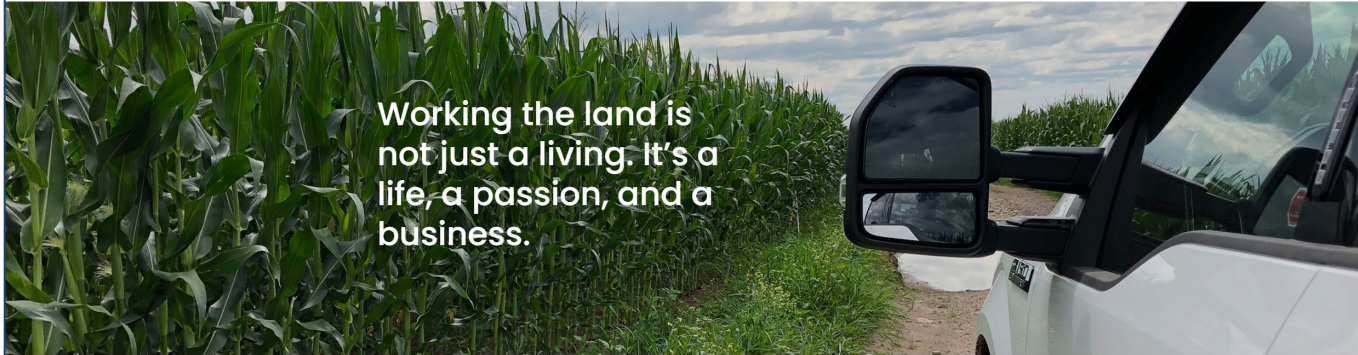


Regenerative Agriculture

Principles include:

- Sequestering carbon,
- Create soil resiliency,
- Enhance nutritional
- Improve water
- Restore

Residual Amendments meet all these principles
Call to "Action" to review Regulations



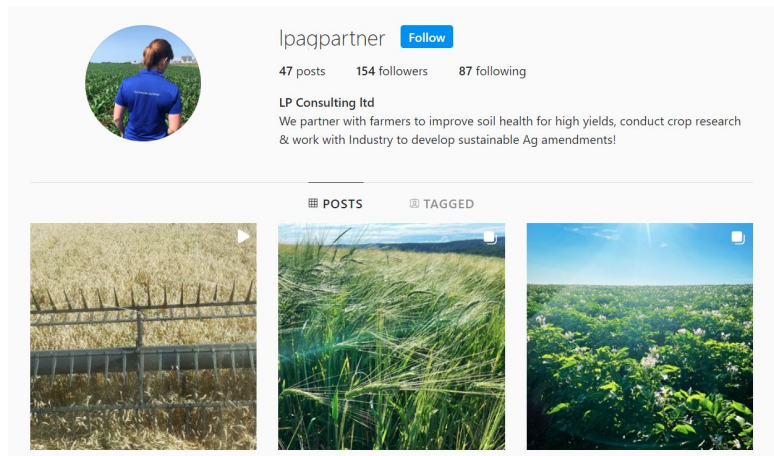
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We help make it work and work well.

We work with stewards of the land — farmers and industry alike — to make the most of the energy we invest in growing. Our office is wherever you are: on the tractor, at the kitchen table, and in the barn.

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Questions?

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