

PG. 40 Check our annual list of high-priority meetings and conferences to plan your winter schedule.

PG. 44 Critics say genetically engineered crops have paved the way for weed resistance. It isn't true.

CROPS GUIDE

Processed biosolids pellets are an excellent source of nitrogen, phosphorus, organic matter, and micro-nutrients.

PHOTO COURTESY OF OMAFRA



Spreading the good news

The list of companies with soil amendment products continues to grow – as does recognition of their value

BY RALPH PEARCE / CG PRODUCTION EDITOR

For 10 years, the bumper stickers said “Farmers Feed Cities.” Today, by contrast, cities may expand their role in feeding farms.

For those who are backing the trend, the drive to make the use of soil amendments standard and commonplace is reaching a tipping point.

The numbers more than suggest there's tremendous opportunity to use so-called biosolids, biomaterials and compost from cities and towns. Across Canada each year, our cities produce about six billion kilograms (13.2 billion pounds) of biomaterials in the form of human sewage a year.

Yet only about half get used in some beneficial manner. The other half still gets incinerated or sent to a landfill.

Add to that the supply of yard and kitchen waste, and the increasing pressure to divert organic materials from landfills, and it seems the time could hardly be better for agriculture to be finding new ways to use these materials to boost soil health and fertility.

Best of all, the trend seems to be winning the day,

despite NIMBY-type opposition that still pops up, and all the safety and health regulations the sector is working with.

Increasingly, the bottom line is cities and towns have a role to play in farming sustainability, including soil health improvements.

SIGNS ARE EVERYWHERE

In presentations at conferences and annual meetings, and in discussions between growers and with provincial ministry personnel, the topic continues to generate interest. By late in 2016, most of the businesses involved in selling and applying biomaterials — or soil amendments, as they're also known — are sold out and were already working on building their inventories for early 2017.

Some companies have invested heavily in developing storage sites and following all of the necessary regulations, while others subscribe to a “just-in-time” delivery model employed by the auto industry and agriculture's equipment sector.

Storing biomaterials requires another layer of logistics, accountability and risk management, and the dollar values for biomaterials aren't yet high enough for some companies to justify that next step.

But that too is changing, says Christine Brown, field crops sustainability specialist with the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

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What the science says...

Last March, a group of four scientists penned an open letter, “The Dangers of Biosolids,” which was published in the *Hamilton Spectator*. The letter argued against the use of soil amendments on farms, stating “An unimaginably large number of chemical and biological contaminants exist in these materials...”

The letter went on to name various chemical compounds found in municipal biosolids, including PBDEs and PCBs. Among their solutions, these scientists said that municipalities should stock-pile or landfill the materials “in secure locations with full leachate collection systems until a more responsible means of dealing with the problem is implemented.”

Dr. Paul Sibley, professor with the School of Environmental Science at the University of Guelph, joined with three other professors from different universities in rebutting the letter, expressing “considerable dismay” with the original document.

Published August 10, the rebuttal said the debate needs “a more balanced perspective” based on scientific evidence.

“That letter was based on what I perceived to be an irresponsible representation of an issue from people who call themselves scientists, and there were so many problems in the way in which they presented their argument,” says Sibley. “To my mind, it resorted to fear-mongering and seemed to be agenda-driven.”

The danger, says Sibley, is that opposition to biomaterials may be shaped more by ideology than by science.

“You have to realize that for the most part, they (scientists opposed to biomaterials) are in the minority,” notes Sibley. “The problem is that they’re often a very vocal minority, and in this day and age of media, they can seem to have a disproportionate voice on an issue.”

Opponents also know how to tilt the emotional balance in their favour, sticking with phrases such as “sewage sludge” rather than “biomaterials.”

“We’re definitely heading in the direction of increased use, and a lot of these companies that have the license to apply these biosolids are at their maximum; they’re receiving requests that exceed their supply,” says Sibley. “I do think it’s necessary to manage these in a responsible way. The question is, can that be done in a manner that is safe? And the evidence, almost overwhelmingly, supports that it is a safe product.”

Sibley says he’s not trying to champion any cause. If the situation was reversed and the weight of evidence indicated that biomaterials were a hazard, he says he’d be standing against their use, because that’s what he does as a scientist.

The weight of evidence shows biomaterials are a safe, sustainable and responsible way of managing waste. The alternatives would be to landfill, but our landfills are already overtaxed. On the other hand, Sibley says he might support incinerating, but only if it’s used in co-generating power. At least then there would be a tangible benefit.

Far simpler is to recycle the biosolids, Sibley says, since this closes the loop and sends nutrients that are initially derived from soils through plants and into food sources, back to farmland. In an environmental sense, it would also alleviate some of the problems created by regular municipal discharges of raw and partially treated sewage into nearby waterways. And it could help reduce the potential for algal blooms in the Great Lakes, as the need for synthetic fertilizers would be reduced.

“The challenge for an environmental chemist today is we can detect down to parts per quadrillion,” he says. “The problem is that we’re able to measure almost down to molecules with our detection capacities, but what it’s done is that over the years, chemicals that we didn’t know were there or couldn’t detect before are suddenly there now. This ‘sudden appearance’ of ‘new’ chemicals immediately raises alarm bells even though the risks associated with such small concentrations are vanishingly small.”

Several factors are coming together in something of a perfect storm to push and pull the issue from both sides — pushing from where the materials originate and pulling from where they’re being applied.

First, there’s the increased emphasis on soil health and sustainability.

“The other thing that’s helped is that as livestock farmers either sell their livestock or as they buy more acres, they know the value of their manure,” says Brown. “They don’t have enough, so they know that it’s worth getting — even from municipal sources.”

A lot has changed in the past five to 10 years, particularly in how the materials are perceived. There was a time when people couldn’t stand the thought of putting municipal biomaterials on their land: it was deemed “toxic” by some, and unsanitary by others, and many had fears that there would be long-term consequences and possible difficulties with insurance.

The biggest change came within that 10-year time span, when farmers first set the price for manure or biomaterials at a dollar per tonne or a dollar per thousand gallons. That, notes Brown, was the first time people started looking at manure sources with a monetary value. And if they couldn’t get manure, many decided to see what else they could get.

Today, biomaterials ranging from leaf/yard compost to Nutri-Pel, LysteGro to municipal digestate are being treated as fertilizer materials, not only economically, but also with the 4R principles in mind.

There’s also a lot more sophistication in how specific biomaterials can be matched with specific soil requirements.

“If I have high-fertility fields or I want to build up my organic matter on the eroded knolls, but I don’t want to put too much nutrient down that it creates a phosphorus or nitrogen risk, then I’m going to use something like leaf/yard compost because it has low nutrient density,” Brown says. “If I have a soil test that’s three for phosphorus and 17 for potash, I’m going to try to put my most nutrient-rich material that I can there, because organic matter isn’t the issue as much as nutrients.”

STILL A LOT OF DEFINITION

Ask Frank Peters about biomaterials and he can cite chapter and verse of Ontario’s Compost Quality Standards, established in July 2015.

Peters also knows the objections he can expect to hear from naysayers, and he's familiar with the ongoing challenges faced by players in this budding industry.

For starters, the list of terms and acronyms that exist in biomaterial jargon is almost as long as the number of companies involved. There's the active participation of the Canadian Councils of Ministers of the Environment (CCME), the two classes of compost — A and B, while Ontario and Quebec have a “premium” class — AA. There's also the Non-Agricultural Source Materials (NASM) plan required for the application of different amendments (primarily sewage biosolids).

There are also setback standards, wait times and different geographic locations for different types of biomaterials. London, Guelph, Toronto, Windsor, Hamilton, Ottawa and Niagara are just some of the municipalities dealing in processed biosolids (from sewage) or compost. Then there's the list of brand-name products like Lys-teGro, N-Viro and Nutri-Pel.

According to Peters, whose business venture, AIM Environmental Group, produces source separated organic (SSO) compost, the key is to learn as much as possible about the options, and then to determine what they offer relative to a farm's needs.

Part of that includes understanding each product has its benefits and challenges. For instance, some compost materials are dry with low density, so application may require large volumes to have the best result.

“For example, you can have three or four or five different types of compost,” says Peters, who's been involved in processing and using SSO compost for 10 years. “They

“ **As livestock farmers either sell their livestock or as they buy more acres, they know the value of their manure.**”

Christine Brown, OMAFRA

all have their place and their purpose, and what they're best suited for.”

When looking at the overall picture of amendments, Peters believes there's little reason for concern because of the classifications and guidelines in place. As well, the process by which municipal sewage undergoes anaerobic digestion and the centrifuging of many products makes them safer than they were 10 or even five years ago.

Lystek International uses potassium hydroxide and heat to stabilize its liquid biosolids-derived product, while N-Viro's biosolids are processed with kiln dust to offer a liming benefit. There's even a composting process being developed that provides a pathogen-kill over a period of time.

In the end, it's no different from what humans have been doing for centuries, pil-

ing livestock manure and turning the pile, then returning it to the fields the next year.

For Peters, the most significant change has been the 2015 update on the guidelines governing the use of biomaterials — the first in Ontario since 1996 — providing businesses an added assurance of reduced risk and viability.

“Over the years, there's been a lot of push-back publicly from applying human biosolids to farmland,” says Peters. “That push-back comes mainly from people not knowing if the metals or other contaminants are easily transferable back into the human food cycle.”

Through efforts by organizations like OMAFRA or the Ontario Soil and Crop Improvement Association (OSCIA) and companies involved to educate agriculture and the general public, the acceptance is growing, as can be seen in the steadily increasing demand.

CONFUSION IS FADING — SLOWLY

Mike Lishman understands that farmers are still confused by the labyrinth of classifications that weren't there before. A grower who farms near Jarvis, Ont., Lishman has worked with Peters from the start, and

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Additional reading

- www.ontario.ca/page/ontario-compost-quality-standards
- www.compost.org/conf2016/6a_Compost_Feeds_Farm_Soils/Assessing_Soil_Amendments_for_Agriculture_C-Brown_OMAFRA.pdf
- www.ccme.ca/

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Different companies offer different products, such as compost which is easier to apply uniformly compared to solid manure.

PHOTO COURTESY OF OMAFRA.

remembers the early days when compost was a near giveaway at \$0.50 per ton. It's now \$7 to \$8 per ton.

"You talk to other businesses in Ontario, there's not enough to go around," says Lishman. "We're sold out until next year and we're buying from other plants trying to fulfill needs, and if we could get our hands on another 20,000 tons tomorrow, we'd take it."

From a farming perspective, Lishman also points to the effect of surging land prices in the past eight years. More growers are figuring it pencils out better to improve the soil they already own rather than purchasing more.

The tendency, Lishman knows, is for people, including farmers, to begin by thinking of composting in the same context as a garden. But attitudes are changing as more farmers get more experience.

"The biggest thing with amendments is logistics," says Lishman, adding that with all of the amendments out there, there's likely something that fits a farmer's soil or cropping regimen.

For businesses, the challenge is to give farmers a positive experience the first time out, he adds. "You have one chance to make a grower happy. If that's missed, that's what they'll remember."

This also means being able to work through what may be the biggest issue with biomaterials — the sheer volume of material to be moved.

Applying four tons to the acre of SSO

compost on a 100-acre field requires trucking 10 tractor-trailer loads to the farm, Lishman says. It's a lot of material, and it requires a spreader big enough to reduce compaction.

Also, some are concerned about standardization. As companies grow, their ability to pull in consistent supplies of feedstocks also increases. And, there's still the question of putting a price on soil organic matter, and that, according to Lishman, requires standardization in soil testing, and perhaps a change in testing methodologies.

GOING FORWARD

While farmers overall still have some learning to do about types of biomaterials and protocols, the good news is conditions are continuing to improve.

More businesses are likely to start up and existing companies will expand, which means more farmers will have access to more locations, increasing the flow of information.

Mike Dougherty believes this multi-faceted effort is a solid good-news story that keeps growing. As director of product management for Lystek International, he says the advantages of biomaterials are too great to ignore, and they are also too great to let those who don't understand the science, or can't see opportunity, block the way for others.

"We're a fertilizer production company and we apply our product based

on agronomics and needs of the farmer," Dougherty says, adding they use soil test information, crop removal estimates and the farmer's short- and long-term strategy to determine appropriate application rates.

"There's a cost for the material which is currently between \$20 and \$50 per thousand gallons applied, depending on location and hauling distance," Dougherty says. "The farmer will pay for what they need, but not more... there's incentive to use the material properly and with best management practices such as injection to maximize the value that the farmer receives for the material."

As well, companies such as Lystek are partnering with communities. For instance, the town of St. Marys, northeast of London, recently entered into an agreement to have Lystek process its human biosolids from its waste treatment plant and be the agent that sells the product to farmers, with the town and Lystek splitting the resulting profits.

Although St. Marys doesn't produce a large amount of material, demand in the area outpaces its supply, as it does for all other Lystek facilities. Dougherty says this will be a growing trend.

Chris Brown also sees a bright future for biomaterials. She believes there are opportunities to develop new products, or to incorporate cover crop seed with any of the organic amendments.

The sector will evolve, becoming more farmer-friendly, with better products and better logistics, she says.

Eastern Canada created an infrastructure to handle all the logistics, transportation and equipment involved with traditional fertilizer products. Will it adapt that infrastructure to include biomaterials too?

An increasing number of farmers and ag businesses are investing cash in the belief the answer is yes. **CG**

Additional reading

- [www.thespec.com/opinion-story/6368861-scientists-open-letter-on-the-dangers-of-biosolids/\(Original open letter\)](http://www.thespec.com/opinion-story/6368861-scientists-open-letter-on-the-dangers-of-biosolids/(Original+open+letter))
- [globenewswire.com/news-release/2016/08/10/863278/10164510/en/Biosolids-Wasting-a-valuable-resource-or-being-resourceful-with-a-valuable-waste.html \(Sibley et al rebuttal\)](http://globenewswire.com/news-release/2016/08/10/863278/10164510/en/Biosolids-Wasting-a-valuable-resource-or-being-resourceful-with-a-valuable-waste.html(Sibley+et+al+rebuttal))