Memorandum

To: Cambridge City Council Health and Environmental Committee
Co-Chairs Quinton Zondervan and Jan Devereux

From: NEBRA

Date: October 29, 2018

Re: Technical response to testimony presented to Cambridge City Council Health and Environmental Committee, at October 9, 2018 hearing regarding the City’s recycling program.

Background

This document provides detailed information in response to comments and concerns submitted to the Cambridge City Council Health and Environmental Committee at a October 9th meeting and public hearing by Laura Orlando, Kirstie Pecci and Amy Perlmutter.

Definitions

• **Sewage sludge, wastewater solids** – the semi-solid material separated out from wastewater at a wastewater treatment facility (WWTF) (aka water resource recovery facility, or WRRF); it usually contains from ~70% - 97% water, depending on how much it is dewatered

• **Biosolids** – wastewater solids that have been treated and tested and meet regulatory standards for application to soils in accordance with federal U. S. EPA 40 CFR Part 503 regulations and Massachusetts DEP 310 CMR 32 regulations. Biosolids are not Hazardous Waste nor Toxic Waste under state and federal regulations and definitions.

• **Co-digestion** – Digesting two different types of material together in an anaerobic digester. In the wastewater treatment profession, “co-digestion” refers to adding food scraps and other non-wastewater-derived organic materials (e.g. fats, oils, & grease) to anaerobic digesters processing wastewater solids at a WWTF. Around farm digesters, “co-digestion” refers to mixing food scraps and other off-farm materials with animal manures in on-farm anaerobic digesters.

• **EQ (Exceptional Quality) biosolids:** defined under 40 CFR Part 503 as biosolids that meet Class A pathogen reduction standards and specific vector attraction reduction requirements and have trace contaminants below the maximum levels in Table 3 of Part 503. The Greater Lawrence Sanitary District (GLSD), which processes Cambridge’s food scraps, produces an EQ biosolids product.
Topics of Agreement Voiced at the October 9, 2018 Hearing

• The Cambridge food scraps diversion program has had great success and is well-run. It deserves – and has received – applause from a wide variety of stakeholders, including all those speaking at the October 9th hearing. As Kirstie Pecci (CLF) pointed out, it is an essential part of meeting Zero Waste goals. We agree.

• Cambridge’s program is not currently a “composting” program, technically. Laura Orlando and several citizens expressed this concern. We agree. We also recognize that changing the program’s name involves costs and could lead to further confusion.

• The general basics of the current program for managing Cambridge food scraps are understood by all commenters. However, there is confusion about many of the fundamental details. We address these below.

• “Prevention is the way to mitigate the damage from toxicants.” We agree with the core meaning of this statement by Laura Orlando – that potentially toxic contaminants in waste streams are best managed by removing them from use and/or capturing them before they enter the waste stream. However, her statements give no acknowledgement to the longstanding regulatory controls and documented results from modern wastewater treatment systems. The first major control is through industrial pretreatment programs, which are required of all applicable WWTFs (those with industrial inputs), including that of the Greater Lawrence Sanitary District (GLSD). Discharges of hazardous chemicals or elements at levels that could cause harm to the environment, public health, and/or the wastewater treatment facility functions are strictly prohibited, and industries are regulated and monitored through local pretreatment permits. Wastewater treatment facilities are biological systems operated by human beings, and if toxins enter in significant concentrations, the treatment process can be disrupted and human health impaired. In the rare event of illegal discharge of hazardous material, the system crashes, operators become aware of the disruption, and the solids are segregated and tested and disposed of appropriately, as needed. Biosolids quality is thus protected. Pollution prevention (P2) programs, also called source reduction, also help protect wastewater and biosolids quality.

Resources: Pretreatment

• U. S. EPA industrial pretreatment webpage: https://www.epa.gov/npdes/national-pretreatment-program
• U. S. EPA pollution prevention webpage: https://www.epa.gov/p2
• Impacts of pretreatment: https://www.ncbi.nlm.nih.gov/pubmed/24645543
“There are thousands of peer-reviewed papers on biosolids management,” said L. Orlando in verbal testimony. This is correct. Biosolids beneficial use has been, and continues to be, one of the most studied recycling practices in North America, with volumes of academic and government sponsored research dating back decades. There have also been two National Academy of Sciences reviews that confirmed “negligible risk” and that current regulations have not failed to protect public health. Every U. S. state allows biosolids recycling to soils, and decades of experience have also not shown any significant negative impacts. And the overwhelming majority of these peer-reviewed papers find benefits and limited risks from use of biosolids on soils in accordance with federal regulations and current best management practices. Approximately 55% of all biosolids generated in the US are beneficially used every year – over 15 million tons each year - and have been for decades.¹

“What Cambridge does with its food scraps, matters greatly.” – L. Orlando testimony, p. 3. We agree. What matters the most is diversion of food scraps from landfills; that has the greatest environmental value. Composting and/or co-digestion at a nearby WWTF are both environmentally sound ways to manage the diverted food scraps, and we support both. But, co-digestion is considered a higher-value use in EPA’s food waste management hierarchy,² because it puts to use the energy in food scraps, along with preservation of the nutrients for beneficial use. Whatever systems Cambridge can develop that increase diversion from landfills are good.

Some of the October 9th testimony exhibited significant lack of understanding regarding the technical issues surrounding co-digestion and wastewater treatment. They also ignored the Massachusetts Department of Environmental Protection (MassDEP) outlook and projections which recognize that composting alone cannot be the only solution for food scrap management, because of difficulty developing and permitting new sites, challenging economics, and the sheer capacity needed to meet the Commonwealth’s food waste diversion goals. Although we strongly agree that composting can be part of the answer to meet the state’s needs, the markets and practicalities of managing increasing volumes of food scraps currently strongly favors co-digestion at fully permitted and regulated facilities like GLSD.

Cambridge is properly recognizing and working within real-world constraints.

¹ See NEBRA, scientific basis for biosolids use: https://www.nebiosolids.org/resources/#/scientific-basis-for-biosolids-use/
² See letters of testimony from U. S. EPA and MassDEP to the Cambridge City Council Health and Environmental Committee, Oct. 9, 2018. Copies available on request from info@nebiosolids.org.
**Topics of Concern** Voiced at the October 9, 2018 Hearing

**Wastewater Treatment**

“backing off sewers” “WWTPs are multipliers of environmental trouble” — L. Orlando testimony, pp. 2 & 3

These statements by Laura Orlando echo what she and others at her organization, RILES, have stated in the past: that sewers and centralized wastewater treatment are somehow dangerous and should be questioned and not expanded. Such statements from a teacher of public health are troubling and are directly counter to the clear evidence of the many successes of the Clean Water Act, including the resulting cleanup of Boston Harbor, which have dramatically improved water quality, human health, and the environment nationwide. According to a survey of medical professionals reported by *BMJ (British Medical Journal)*, sanitation is the most important advance in public health since 1840 (when the Journal was first published).³

It is also noteworthy that several local academic institutions, including Boston University’s Sustainability Committee, have done thorough reviews of the CORe® facility and GLSD’s program and are also choosing it as a solution for food scrap management.

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**Resources: Sanitation and the Clean Water Act**

- Effectiveness of Clean Water Act: [https://www.foreffectivegov.org/clean-water-act-40th-anniversary](https://www.foreffectivegov.org/clean-water-act-40th-anniversary)
- Boston University discussion of food scrap management: [http://www.bu.edu/sustainability/what-were-doing/food/compostingbu/](http://www.bu.edu/sustainability/what-were-doing/food/compostingbu/)
- GLSD’s food scraps & renewable energy program: [https://www.nebiosolids.org/member-highlights#/greater-lawrence-sanitary-district/](https://www.nebiosolids.org/member-highlights#/greater-lawrence-sanitary-district/)

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**Facts about the GLSD:**

- Design capacity: 52 MGD, actual current daily flow ~ 26 MGD
- Number of existing digesters: 3. A new fourth digester is coming on line shortly (Laura Orlando incorrectly stated it has been operating “for some time”).
- Tons per year of Class A biosolids pellet fertilizer manufactured: 5,000 (These biosolids are produced at the GLSD facility, not elsewhere, as suggested by Kirstie Pecci on October 9th).
- 100% of GLSD Class A biosolids pellets are sold – not given away – every year to local farmers and landscapers who value the product for its effectiveness.

³ See BMJ: [https://www.bmj.com/content/334/7585/111.2](https://www.bmj.com/content/334/7585/111.2)
Biosolids Quality & Use

“...sewage sludge, the always toxic byproduct of wastewater treatment.... Whatever toxicants, hazardous materials, and other pollutants that happen to be removed from the water in the process of wastewater treatment, and that are then concentrated in the sludge, will remain in the sludge.... all sewage sludge contains toxic and hazardous materials...” — L. Orlando testimony “toxic sewage sludge... thousands of other chemicals can exist in sewage sludge that aren’t tested for, and subsequently are spread on our fields...” — K. Pecci testimony, p. 3

Yes, wastewater, sewage sludge, and biosolids contain traces of chemical contaminants, but so do many other common materials and things we are exposed to every day. Wastewater and biosolids are mirrors of modern society and the environments we live in. Human exposure to myriad trace chemicals, good and bad, are far greater in daily living than conceivable through biosolids recycling.

But the dose makes the poison – not the mere presence that might be measured. Human exposure through the biosolids pathway is minimal to none, and research shows the large majority of trace chemicals break down in the wastewater treatment processes, in soils, or are sequestered in soils.

No regulatory agency considers biosolids to be “hazardous” or “toxic”. These are formal defined terms misapplied by some of those testifying to the Committee.

Statements like those above are belied by the fact that tens of thousands of public WWTF operators are exposed daily to raw wastewater, treated wastewater, raw solids (sludges), and biosolids – and yet they do not receive hazard pay, their insurance rates are not significantly different from similar job categories, and studies have shown their health is not significantly different from the general population.

Nothing in the processing of sewage sludge “treats”—e.g., detoxifies —sludge.... — L. Orlando testimony, p. 1 “Anaerobic digestion has no impact on the multitude of toxins in sewage sludge that have been identified by the U.S. EPA.” — K. Pecci testimony, p. 3

Research has clearly demonstrated, many times, that wastewater treatment, anaerobic digestion, composting, biosolids treatments, and soil microbial activity all break down and transform many of the trace chemicals of potential concern found in biosolids.

“...hundreds of known toxic chemicals in sludge are not” regulated... The thousands of toxicants in wastewater and sludge are not regulated because we do not have the technology to remove them.” — L. Orlando testimony, p. 1

Just because regulations do not require testing for particular compounds does not mean research and regulatory authorities have not evaluated such compounds for possible regulation. Indeed, as prescribed by the Clean Water Act, every two years, U. S. EPA screens for trace contaminants of potential concern in biosolids, evaluates them for potential regulation, and releases public reports.⁴

⁴ U. S. EPA biosolids biennial reviews: https://www.epa.gov/biosolids/biennial-reviews-sewage-sludge-standards
More importantly, ongoing research and peer-reviewed publications address concerns about trace contaminants in biosolids all the time. And, generally, they do not point to the need for further regulatory requirements for testing and monitoring of trace contaminants in biosolids. One type of research – bioassays – look at potential environmental impacts of the whole biosolids-soil system, examining such details as avoidance behavior and changes in metabolism in soil organisms and plant uptake. Even these do not find significant negative impacts, only positive ones caused by the increased nutrients and organic matter provided by biosolids. All these kinds of research should continue, and we help facilitate it when we can.

“regardless, the outcome is a new form of waste...”  – K. Pecci testimony, p. 3

Neither U. S. EPA nor states consider EQ biosolids – like those produced at GLSD – to be wastes. They are soil amendment and fertilizer products that are routinely bought and sold in interstate commerce. Over 15 million tons of biosolids products are successfully marketed in the U. S. every year, providing clear, documented benefits to farmers and growers throughout the country in a wide range of uses. Strong regulatory programs at the state and federal level have ensured that products must meet stringent standards to ensure public safety. The fact that there have been no documented significant impacts to human health from biosolids utilized in accordance with the foundational regulatory program of U. S. EPA – the Part 503 regulations of 1993 - is a recycling and sustainability success.

GLSD’s Class A biosolids fertilizer manufacturing program has been in operation for over 15 years and is regulated and licensed by both the MADEP and the MA Department of Agricultural Resources (MDAR). This product is also a registered fertilizer in MA, CT, and VT. All product is sold to regional farmers and landscapers. In many years, there is more demand than there is supply. MWRA’s Deer Island WWTF, where the City of Cambridge’s wastewater is treated, has a very similar program.

**Resources: Biosolids quality**

- Video - Biosolids: Naturally Sustainable  https://www.weao.org/biosolids-video
- NERBA’s “About Biosolids” info: https://www.nebiosolids.org/about-biosolids/
- NERBA information on trace chemical contaminants (“microconstituents”) in biosolids: https://www.nebiosolids.org/resources/#/microconstituents/
- Water Environment Federation: Fact Sheet on Microconstituents: http://biosolidsresources.org/OE/?page_id=175
Anaerobic Digestion & Biogas

“Making biogas at the plant is a dirty, dangerous operation.” – L. Orlando testimony, p. 3

Anaerobic digestion (AD) is one of the most proven and effective ways of stabilizing wastewater solids, and is in widespread use around the globe. It is not dirty or dangerous, as anyone who has toured a modern WWTF can attest. Modern facilities, like GLSD’s, are built to the highest engineering standards and public safety codes. AD has been in use at WWTFs since the 1930s (e.g. at Los Angeles). While AD is less common in New England than in some other regions (e.g. CA, the Northwest, the upper Midwest), there are plenty of operating digesters in New England, and the number is increasing. AD with biogas use for green energy production is widely seen by government and industry thought leaders and policymakers as a highly sustainable, environmentally beneficial process.

Resources: Anaerobic digestion & biogas

- Water Environment Federation, 2013: Enabling the Future, [https://www.wef.org/globalassets/assets-wef/3---resources/topics/a-n/biosolids/technical-resources/enabling-the-future.pdf](https://www.wef.org/globalassets/assets-wef/3---resources/topics/a-n/biosolids/technical-resources/enabling-the-future.pdf)
- Data on biogas production from the 1200+ U. S. WWTFs that use AD to treat their wastewater solids: [http://www.resourcerecoverydata.org/](http://www.resourcerecoverydata.org/).
- American Biogas Council provides many details on biogas production and use on farms, at landfills, and at WWTFs, including this map of U. S. AD operations: [https://www.americanbiogascouncil.org/biogas_maps.asp](https://www.americanbiogascouncil.org/biogas_maps.asp)

“sludge is so loaded with siloxanes” – L. Orlando testimony, p. 3

Siloxanes have been in widespread use in commerce for many decades, throughout various aspects of our lives, including in many personal care products we use daily. Because some of these compounds partition in the treatment processes to the biogas, they have to be removed to protect engines used to generate electricity from biogas. Siloxane is typically at concentrations of approximately 1.1 parts per million in GLSD biogas. Removal of siloxanes from biogas is routinely done at biogas electricity generation operations worldwide. Human exposure to siloxanes from wastewater treatment and biogas operations is insignificant.⁵

“When there is a disruption in the service by mechanical failure or human error, the gas is released into the atmosphere.” – L. Orlando testimony, p. 3

Any facility producing biogas is required by federal and state regulations to have a back-up flare system to manage the biogas when needed. GLSD has such a system. The biogas – which is 60-65%

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methane (CH4) – is burned in the flare, releasing almost entirely carbon dioxide (CO2) and water vapor (H2O). This CO2 is entirely biogenic, so it is not considered a fossil-fuel derived greenhouse gas. A flare does not combust 100% of the methane; most burning processes don’t. But it is more than 95% efficient. In comparison, the methane released to the atmosphere from landfill disposal of food waste and wastewater solids is far greater. And compost operations also emit small amounts of methane and large amounts of CO2. Nothing is perfect.

“When everything is running smoothly, 18% of the biogas is flared and the rest goes into processing the sewage sludge -- which only consists of 8% of the energy needs of the treatment plant -- which are now increased by the addition of the food scrap slurry. And round and round we go.” – L. Orlando testimony, p. 3

“while processing food waste at GLSD does generate biogas, the entire operation is an energy sink . . . . this process is not sustainable or economical” - K. Pecci testimony, p. 3 and verbal

These statements, and others made by those testifying at the hearing, demonstrate misunderstandings of energy management in modern wastewater treatment, the generation and use of biogas, and the significant role biogas can play in reducing our dependence on fossil fuels and the reduction of greenhouse gases.

Biogas is derived from biogenic (i.e. natural organic) sources of carbon. The controlled capturing and use of renewable biogas is widely seen as a significant opportunity for reduction of greenhouse gases in our atmosphere. Every unit of biogas used to generate electricity or fuel a vehicle displaces an equivalent unit of fossil fuel-derived natural gas. Therefore, GLSD’s food scraps to energy program is carbon negative. It offsets large amounts of electricity that would otherwise be generated by fossil fuel usage at regional power plants.6

Both co-digestion and composting can reduce GHGs as compared to landfilling or incineration of the valuable organic matter. But co-digestion is significantly more carbon negative than composting, because it converts a large amount of carbon (C) to methane (CH4), versus composting, which converts a significant amount to carbon dioxide (CO2). Both processes can lead to a useful product (biosolids fertilizer pellets or finished compost), which, when land applied, sequester the remaining carbon in the soil. When full scope GHG analysis is done, co-digestion reduces GHG emissions more than composting alone. This is the fundamental reason EPA and policymakers favor digestion over composting in the waste management hierarchy. Both are good processes; but one is better from this specific perspective.

More facts about GLSD:
The electricity generation portion of the GLSD system is similar to what happens at most WWTFs that produce and utilize biogas. However, fewer facilities use biogas for heat-drying the wastewater solids, although more are doing so because of the energy efficiency involved. The following details are

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6 As noted in references above, see Water Environment Federation, 2013: Enabling the Future, https://www.wef.org/globalassets/assets-wef/3---resources/topics/a-n/biosolids/technical-resources/enabling-the-future.pdf
related to typical GLSD operations; variations are made as needed based on biosolids fertilizer facility needs, biogas production rates, electricity market prices, etc.

- When the all new systems are operational, GLSD will produce up to 1.3 million standard cubic feet / day (scf/day) of biogas.
- Of the total biogas produced, approx. 250,000 scf/day is used to dry the dewatered biosolids into a Class A biosolids fertilizer product.
- The balance of the biogas, or approximately 1 million scf/day, is piped to the engine generator(s).
- The heat from the engine generators is captured and used to heat the digesters.
- The electricity generated – approximately 2,800- 3,200 kWh/day, will provide 100% of the WWTF’s electricity, much of which would have been purchased from the grid. This is a value of $2.5 million a year.

Here is another example of the value of biogas

These data are from MWRA’s regional Deer Island WRRF (where Cambridge’s waste water is treated):

- Deer Island Treatment Plant (DITP) influent – 330 MGD avg annual flow
- DITP solids loading – 265 dry tons per day, 94% captured during WW treatment
- ~240 dry tons per day of solids end up in the anaerobic digestion (AD) units. This sludge is 76% primary, 24% secondary.
- DITP egg-shaped digesters: 12 units total, 8 in operation, avg hydraulic detention time 21.3 days
- Solids destruction – 52.6% TS, 64% VS
- 100 dry tons per day remain after AD and are sent to the biosolids fertilizer (heat-drying, pelletizing) operation
- Approximately 190,000 cu ft per hour of digester gas are produced on an annual average.
- 98.7% of this biogas is beneficially used to produce heat and power at DITP. Biogas accounts for 94.1% of heat needs of the plant.
- Biogas value to MWRA: 12 yr avg:
  o Electricity + Renewable Incentive Benefit = $41.5 M
  o Thermal Benefit = $216.2 M
  o Total benefit = $257.7 M over 12-yrs or $21.5 M per year
  o What this means – MWRA does not have to buy electricity or fuel to the tune of a $21.5 M savings on its annual budget. DITP’s annual operating budget is $60 M. Without digester gas, DITP’s budget would be $81.5 M – that is a significant savings and value to our authority and Cambridge (and other) citizens/ratepayers.
  o Just to qualify the above numbers, maintenance accounts for 7.7% of the annual benefit over the 12-yrs so there is a cost to keep the systems running but still a good savings: $19.8M

The Economics

“the City of Cambridge is participating in a rebranding of WWTPs like the GLSD to bring in revenue from new sources” – L. Orlando testimony, p. 2 “This infrastructure was teed up by the state and GLSD.... millions have been invested by the state to turn your food scraps into a source of pollution.
The same investments can be made to create transfer stations and other infrastructure necessary to turn food scraps into compost.” – L. Orlando testimony, p. 2. “GLSD’s energy intensive operation is also exorbitantly expensive…. By sending food waste to GLSD, Cambridge is adding a financial burden to the taxpayers of the Merrimack Valley and the residents of Massachusetts.” – K. Pecci testimony, p. 4

Yes, stewardship of a public facility like GLSD includes careful use of public funds and maximizing efficiencies. Grants have been provided to the GLSD system for co-digestion as follows. These organizations see the value of investing in co-digestion and the resulting clean energy:

- DOER - $5M
- MassDEP - $500,000
- Clean Energy Center - $400,000
- National Grid - $2.34 M
- Clean Water Trust - $1.6M

Energy credits play an important role as incentives for renewable, green energy investments. This project is approved for Renewable Energy Credits (RECs) and Alternative Energy Credits based on the green electricity and heat produced. Based on today’s market, the value of these credits is approximately $300,000 per year.

“This becomes an environmental justice issue when one considers the increase in O&M from the food scraps program at the treatment plant.” – L. Orlando testimony, p. 2.

This statement is unfounded. First, GLSD is a regional facility serving multiple communities, and it has an exceptional record as a good neighbor in the host community, North Andover. We encourage you to communicate directly with the officials there if you have questions.

Second, this project was committed to after significant study and deliberation by the GLSD Board, which includes members from all of the communities served. It is viewed as a long-term project and investment, and it would not have been done without conservative assumptions around the project economics. Savings from avoided electrical costs, avoided natural gas costs, and revenue sources such as tipping fees will offset operation and maintenance and debt repayment costs associated with this project.

“Waste Management is happy to use tax-payer subsidies; they are taking the $65 tipping fee happily, knowing that communities are not going to allow for landfiling.” - K. Pecci verbal testimony

With the exception of a recent small grant from MassDEP to fund a second food waste slurry storage tank – enabling the facility to help meet the Commonwealth’s goals of recycling food waste – 95% of the Waste Management project costs were funded privately by Waste Management. There are no subsidies or other payments. The tipping fees at this facility remain competitive with other food waste recycling options.
“Waste Management . . . adds a tremendous amount of water to the food waste to make it pumpable . . . and then adds all the costs to the transportation of the slurry to Greater Lawrence . . . making the economics and carbon footprint even worse” K. Pecci, verbal testimony

This is not true, and again shows a lack of understanding about the technical details of this process. Waste Management adds very little water to the food waste at the CORe® facility – most food waste delivered is <20% total solids, so very little additional water is needed. The only city water added is used to assist the bioseparation process and for facility clean up. And, in fact, the facility’s purchased water consumption has been trending down since it came on line as more waste liquids, such as off-spec beverages and food processing facility liquids are coming to the facility.

Most modern compost facilities must also add water to aid in the composting process and maintain the right moisture content for biological decomposition.

And all costs for transport of the food slurry to GLSD are included in the operating costs and incorporated in the tip fee. It is not subsidized in any way.

**Greenhouse Gas Emissions**

“The IPCC estimates that 5% of global methane (CH4) emissions and 3% of global nitrous oxide (N2O) emissions come from wastewater treatment plants.” – L. Orlando testimony, p. 3 Kirstie Pecci also addressed GHG emissions in her testimony.

This is a misunderstanding of the IPCC “wastewater” category. These emissions are from “wastewater and sludge treatment and discharge systems,” not just treatment plants of the kind we have in the U. S. In fact, as shown in the IPCC table below, the most significant CH4 and N2O emissions are from open sewers, disposed (landfilled) solids (sludges), and river discharges of inadequately treated wastewater.
If you look at just U. S. data, which covers modern wastewater treatment – because that is what we are fortunate to have – the percentages are lower:

U. S. nationwide GHG inventory, 2016 data:
Wastewater treatment is 0.3% of total CO2e emissions (CH4 + N2O)
The comparable number for composting is 0.06%
Wastewater treatment is 2.25% of total CH4 emissions

When it comes to managing wastewater, systems in developed countries do better in terms of GHG emissions than the less-well-managed wastewater in developing nations. (The reality is that public health and GHG mitigation can be significantly advanced in developing countries by improving the management of wastewater, wastewater solids, and fecal sludges.)
When it comes to managing wastewater solids, anaerobic digestion and beneficial use of the resulting biosolids has been shown by research to be the best option with regards to net GHG emissions, especially when compared to landfill disposal or incineration (Brown et al., 2011).

**Resources: Greenhouse gas emissions and biosolids management**

- Water Environment Federation, 2013: *Enabling the Future*, [https://www.wef.org/globalassets/assets-wef/3---resources/topics/a-n/biosolids/technical-resources/enabling-the-future.pdf](https://www.wef.org/globalassets/assets-wef/3---resources/topics/a-n/biosolids/technical-resources/enabling-the-future.pdf)

**Compost vs. biosolids heat-dried fertilizer pellets**

Following are a few more clarifications related to the manufacture, safety and benefits of Class A biosolids fertilizer pellets and composts.

- Both compost and biosolids heat-dried fertilizer pellets (produced at GLSD) are carbon-rich (organic) soil amendments that provide macro- and micronutrients and other benefits that improve soil health. Compost has more carbon and is less dense in nutrients, because of the carbon-rich (woody) amendments added in the composting process, and some nitrogen is lost as ammonia (NH3) during the process. Both products, however, add to carbon sequestration in soil.

- The agricultural and horticultural uses of these two soil amendments differ, but both are valuable and effective. For example, biosolids fertilizer pellets are preferred by farmers growing feed corn and hay, because they have a higher nitrogen concentration. Both materials are safe for use on any soils. They should both be used in accordance with agronomic needs and best management practices, to avoid nutrient losses to water bodies and to maximize their benefits.

- Research has shown that food scraps are very high in volatile solids, meaning that as much as 90% or more of their mass is converted to biogas in the co-digestion process. Thus, green energy production is the major outcome of the Cambridge food scrap diversion program. Only a small portion of the solids from the food scraps are retained in the final biosolids. GLSD experience is consistent with this research and experience at other systems nationwide: the total mass of solids produced from co-digesting food scraps is not much higher than the mass produced from digesting the wastewater solids alone.

For further details from NEBRA, call 603-323-7654 or see [https://www.nebiosolids.org](https://www.nebiosolids.org).