Applying Sewage Waste onto Agricultural Land

Do farmers know what is in their fertilizer? Informing unaware farmers.

Tags Words: Sewer Sludge; Toxic; Biosolids; Alternative fertilizers.

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Summary:
In the past few centuries, agriculture has allowed the human population to rise exponentially. Human advancement in technology and knowledge has greatly increase the yield of food available. In turn, more food is available to support the increase in population. A recent technique has allowed to improved yield by just applying a fertilizers to the land. These compounds help increase the concentration of nitrogen as well as other vital nutrients required for plant growth. However, what farmers don’t know is exactly what they are applying to their land. A subcategory of fertilizers called “biosolids” is composed of recycled sewage waste water sludge. This sludge contains high levels of toxins, heavy metals, and pathogens which can be harmful for the plants, environment, and us. By informing farmers, we can help the farmers make the right choice and cut down on biosolid use. We called multiple farmers around the entire state of New Jersey to survey what they put on their land. A majority of farmers have never heard of or use biosolids. Only several have heard of them and even a smaller portion use biosolids. After surveying the farmers, a brief summary of what biosolids are was provided to the farmers. Additionally, a detailed information packet was offered. Most farmers accepted one of the packets. Hopefully with their newfound information, they will be more aware of the situation and not consider biosolid use.

Video link: http://www.youtube.com/watch?v=AGSuznHCIPU

Are farmers poisening their crops with sludge? (AH)
Sludge is considered anything that is semi-solid and a byproduct of wastewater and sewage treatment. Sludge has it’s pros and cons like everything else. The whole process of sludge begins with formation of organic material getting collected through treatment plants, where water is extracted and recycled and the remaining product is heated at a high temperature to eliminate bacteria and other pathogens. This step makes the sludge a little more safe, which is then called a “biosolid”. Biosolids can be reused as fertilizers, which helps recycle their organic material to serve as nutrients for plants. There are other methods to recycle or eliminate sludge and can be done by using anaerobic bacteria to decompose and pyrolysis, which is the burning the sludge that leads to the release of gases such as carbon monoxide and carbon dioxide back into the environment. Sludge used to be thrown away in the ocean, but that wasn't environmentally safe. Landfills were also used to recycle the sludge.

There are two types of indications of sludges, Class A and Class B (Frequent, n.d.). Class A is sludge that is dried and heated to a certain temperature, which eliminates most of the bacteria, but not all. Class B is when the sludge is consider volatile and can cause certain diseases such as Asthma, Cancer and pulmonary distress from its bioaerosol (airborne particles).
How is Class A sludge used (AH)

Class A sludge is used typically by farmers and gardeners as a substitute for chemical fertilizers and help deliver organic nutrients to crops. Although there are many strict regulations with the biosolids because it may become a threat if the sludge is not carefully monitored. Pathogens may form if not regulated carefully, which can spread several carcinogenic diseases through the edible crops. Certain Permits are required in order to use biosolids as fertilizers because they still are a cause for concern and can result in hazardous situations.

In terms of extraction, sludge can be obtained from many treatment facilities, even places where water can be recycled back to the planet. A lot of research has been performed with various sludge to determine how safe it is and also how harmful it is and research suggests that sludge has many long term effects, which can only be seen over time. Sewage sludge produced in wastewater treatment has to be treated efficiently in order to reduce impacts on the environment and on public health. Many countries such as Germany, have large quantities of sludge that are being reused in agriculture to recycle nutrients and organic material. In order to quantify the effect of temperatures on sludge treatment and on disinfection efficiency, a study performed at Braunschweig Institute of Technology resulted in the temperature having a strong effect on sludge stabilization and on natural dewatering and drying technologies. Anaerobic digestion of sewage sludge is a well-known method resulting in energy generation through biogas production and sludge stabilization and sanitization. Anaerobic digestion serves as a method to improve biogas yield in Sewage sludge.

Regarding monitoring purposes, it is essential to set numerical limits for the microbiological quality of sludge. However, when there are major discharges to sewer of wastes from hospitals or animal waste processing plants, it should be compulsory to add safety measurements to analyze such sludge regularly in respect to its microbiological quality. It is crucial to have physical parameters to maintain the control of sludge treatment processes and also to carefully monitor the sludge to ensure that the processes are operating efficiently. Some of the sludge protocols include having the soil on the site to be sampled and analyzed to determine its pH value and the concentrations of the elements. Certain parameters are given for monitoring and must be followed through to have a stable and safer sludge field.

Toxic Sludge Composition (AM)

Toxic sludge chemical composition can vary drastically due to waste water inputs (industrial, agricultural, and residential) to the waste water treatment facility which produces sludge. Chemical composition of sludge includes, but is not limited to, heavy metals, carcinogens (cancer causing agents), and endocrine disruptors (disrupt endocrine system, which may produce adverse developmental, reproductive, neurological, and immune effects). Some heavy metals that may pose as a health risk include: antimony, arsenic, barium, beryllium, cadmium, chromium, lead, and mercury (U.S., 2013). Common carcinogens include: benzene, benzo [A] pyrene (poly aromatic hydrocarbon), 2,3,7,8-TCDD (Dioxin), haloacetic acids (disinfection byproducts), and trihalomethanes (disinfection byproducts). Endocrine disruptors that may present a health risk include: Bisphenol A (as well as other bisphenol analogues), diethylstilbestrol (DES), DDT, polychlorinated biphenyls (PCBs), and brominated diphenyl ethers (BDEs). In addition, another study performed on sewage sludge effluent found the presence of endocrine disruptors such as ethinylestradiol, bisphenol A, and nonylphenols (Sprengler, 2001). Furthermore, a study performed on sewage sludge amended farmland was performed with respect to BDEs, and
determined concentrations that were 100-1000 times higher in the amended soils when compared to unamended soils (Sellstrom, 2005).

Lastly, a study of toxic sludge composition in Indiana revealed the presence of toxic metals such as lead, chromium, nickel, cadmium, mercury, and arsenic (Keffer, 1986).

Toxic metals include most of the heavy metals on the periodic table. These metals and metal compounds have a large negative effect on people's health. In tiny concentrations, many of these metals are necessary to support life. They can help stabilize protein structure, transport oxygen through our blood, and so forth. However, in larger doses, the exposure to heavy metals becomes toxic. These metals may build up in our bodies and become a significant health hazard. In terms of practical uses in gardening, biosolids that contain heavy metals can accumulate rapidly as we apply more to the land. The nutrients and other compounds get used up and new sludge is added on top. However the heavy metals don’t deteriorate or get washed away nearly as rapidly. A list of common heavy metals that are health hazards are: arsenic, beryllium, cadmium, chromium, lead, and mercury. (Toxic, n.d.)

There are a wide variety of arsenic sources. Exposure to arsenic often occurs near or in hazardous waste sites and in natural environment with high levels of natural decaying materials. Exposure to high levels of arsenic can cause death.

Beryllium can be found in a wide variety of different applications. Occupational exposure is commonly seen in jobs that handle mining, extraction, and in the processing of alloy metals containing beryllium. Beryllium can cause sensitization in lung and epithelial tissues. Over sensitization can lead to epithelial cell diseases within groups of exposed workers.

Cadmium is one of the more hazardous metals that are often found in many industrial businesses. Most of these places are areas where ores are being purified or reworked. There have been several reported deaths due to exposure within welders who have unsuspectingly welded on cadmium-containing alloys or with silver solders.

Chromium is found in several different compounds. Some compounds within the chromium family include hexavalent chromium, zinc chromate, lead chromate, strontium chromate, calcium chromate, and chromium trioxide which are all known to generate carcinogenic effects on humans. These metals have been reported to increase the risk of lung cancer to exposed workers. Multiple reports have been documented among workers in industries that generate chromate and make pigments containing chromate.

Lead particles can be found almost everywhere. There used to be lead in paint, children’s’ toys, as well as many pieces of technology and construction materials. Lead can also be present in harmful concentrations in air, water, and foods. Exposure in the work place is more rampant than in other places. Some industries that have high potential exposures include any job that works with metal such as: construction work and smelting practices. Lead poisoning is one of the most common over exposure induced illnesses within children. Some common acute symptoms to lead poisoning are: nausea, constipation, pain, and muscle weakness. Younger children are more susceptible because they are still undergoing rapid neurological and physical development. Lead hinders the physiological development of children and can lead to severe diseases like gastrointestinal, neuromuscular, neurological diseases.

Common occupations that come in contact with mercury include mining, production of mercury containing devices, as well as mining and refining of rare metallic ores. High doses of mercury exposure can lead to severe damage to the nervous system and the kidney. Since mercury is used
in a wide variety of medical technologies, small doses of mercury exposure can occur if devices that contain mercury break. Thermometers are a good example of fragile equipment that contains mercury.

**Sludges effect on people (AM)**
There are many considerations that must be made when assessing the potential for human exposure to these compounds as a result of sludge applications. The state of metals (e.g. insoluble sulfoxides and hydroxides) may prevent the potential for plant uptake (and thus human exposure via ingestion). Contrary to this, some plants may uptake metals at different rates based on their concentrations in soil and thus must be considered when determining appropriate actions against application of sewage sludge. It has been noted in literature that low concentrations of certain metals make facilitate plant uptake whereas high concentrations of certain metals may inhibit plant uptake (Keffer, 1986). In addition, toxicity is a function of dose, and thus some of these potentially harmful chemicals may or may not be hazardous at concentrations that are detected in the environment. Some specific chemicals may also exhibit a high potential to sorb to sediment as well as lipids (representative of organisms), and therefore the continuous application of sludge may dramatically increase chemical concentrations because they are not capable of migrating from the amended soils. The potential for chemicals that partition to sediment and lipids also presents the potential for biomagnification (increase in concentration throughout trophic levels). Treatment options of sewage sludge/effluent must also be monitored because the potential to treat for a chemical may increase or create other potentially dangerous compounds as a result (similar to disinfection byproducts).

**Regulations of Sludge (JL)**
The EPA regulates biosolids in many ways. Biosolid application is regulated in quantity, quality, as well as treatment and application processes. During processing there are very specific protocols, as stated previously, that must be used in order to reach specific classes of biosolids that are applicable. These are designed to limit the amount of pathogens, nitrogen, phosphorus, heavy metals, etc. However, even though the EPA does have regulations in place, they can only regulate the material when it is on site of production facilities (i.e.- water treatment facilities). As soon as they leave the sites, they are considered products, thus are not subjected to any other federal or state regulations (Sicher, n.d. A). This means no further tests for bacteria, virus, pathogen, carcinogens, chemicals, etc. are required on site. The Sludge lobby has had strong influences in politics which allow them to avoid proper labeling their materials used even though the Right-To-Know Law and the Consumer Protection Act require labeling (Sicher, n.d. A). As any corporation who is trying to make money, the sludge manufactures are engaged in loopholes in attempts to maximize their profits with the least amount of problems. They try to make as much “product” and sell it cheaply to people who are willing to use it.

In terms of quality, generally speaking there are two different grades or classes of biosolids that are permissible to use. The EPA states in regards to pathogens: that only Grade A or biosolids that are treated by processes to further reduce pathogens which grants a Exceptional Quality compost with minimum pathogens. This class does not pose a risk of infectious disease transmission through casual contact or ingestion. Grade B is processed to significantly reduce pathogens. However pathogens are still present so proper harvesting restrictions have to be
applied for proper protection on public health. Grade B biosolids are strictly prohibited to come in contact or combined with fresh compost due to the greater potential for pathogen growth.

As “safe” as the EPA claims these biosolids to be, they have many contradictory rules in place. There are many types of regulations when it comes to owning biosolids. In terms of storage, the EPA advocate that users of biosolids should minimize contact between water sources and stored biosolids. The biosolids must be stored in appropriate climate areas. The areas must be selected to avoid precipitation, humidity, both severe cold and hot temperatures and high wind speeds. The topography must be considered. Thus no storage facilities are to be placed on water prone areas, areas with excess run off, or on inclines. If there is a chance of contaminated runoff occurring, proper buffers must be used to protect nearby resources and adjacent property. Stocks of biosolids should be covered with a tarp help shield stocks from the elements. Additional preventative measures on top of carefully selecting storage sites and proper storage, include: buffer zones, diversion waterways, silt fences, dikes, as well as use of filter strips (Recommended, n.d.). The EPA suggests specific designs for farm containers in order to minimize the chance of contamination occurring. Specific containers and building structures/guidelines can be found at http://water.epa.gov/scitech/wastetech/biosolids/upload/2002_06_28_mtb_biosolids_fsguide_chapter5.pdf

Another factor that can play a role in determining where storage facilities will be is the odor caused by biosolids. Since biosolids are processed from sewage waste, it contains many compounds like ammonia, sulfides, mercaptans, and thiols, which do not smell pleasant (as these compounds are found in high concentration in rotting eggs, vegetables, and other waste). Therefore, in order to minimize the odor, farmers are suggested to maximize the distance between storage sites and the residential areas. However the hauling distance of biosolids from storage to field must be considered also. The hauling distance should be minimized in order to prevent exposure to unintended environment. Farmers should also avoid storing biosolids for extended periods of time. Farmers should regularly inspect the biosolid stockpile, as well as after all severe precipitation events. Biosolids can decompose due to heat, moisture, and other abiotic features. As these biosolids degrade, pathogen growth, as well as unwanted chemical concentration may occur. Key features to look for during inspects are: heat and gas generation as well as distinct odors such as ammonia and sulfide compounds.

The quantity and application processes are broadly regulated. Farmers must be wary of the amount of biosolids they apply to the land. Excess use can lead to runoff and spilling onto adjacent property. When being transported, biosolids must be moved with the appropriate vehicle. In case of a spill, the first step in the cleanup process is to ensure public and worker safety. Next, contain the source of spillage and set a perimeter around the spill. Then collect the spilled material. Vacuum equipment on biosolid application vehicles can be used to collect liquid material. Residual amounts can be removed by hand, sweeping, or shoveling. Straw and other commercial adsorbents may be used to assist in liquid removal. Disposal of contaminated materials must be delivered to the appropriate waste sites. Other emergency response and clean up protocols may be used as substitutes.
Are biosolids really worth it? (JL)
Farmers are incentivized to take up offers on free/cheap biosolids by a reduction in cost of operations. However due to a lack of knowledge, when accepting these free or relatively cheap “alternative” compared to actual fertilizers, they can actually do a lot of harm to the themselves. First off, the quality of biosolid isn’t always consistent. They might receive good quality sludge and obtain good results in plant growth. But their next patch of sludge could actually contain many pathogens and other hazardous materials. This could severely affect the yield of crops and hazardous quality sludge could further contaminate the land. Biosolids come from a wide variety of places. They can originate from residential housing to hospitals to factories. Where the sludge comes from has a huge impact on its quality. Thus, the integrity of the biosolids is a total crapshoot (Sicher, n.d., B). As pathogens and other materials accumulate, the nearby property and environment is in trouble. The responsibility of the damage all goes towards the farmer. If their property comes up positive in tests of high traces of metal it is strictly their fault; not the sludge sellers. This forces the property owners to mark their property as “Hazardous Use” on a seller disclosure sheet which reduces the value of their property. Farmers can also be fined if they don’t properly dispose of sludge since it is declared a pollutant, even though the EPA considers it partially safe (Sicher, n.d., B).
Recently the White House’s organic garden was declared non-organic due to the application of biosolids. First Lady Obama’s noble effort to grow an "organic garden" failed after the National Park Service tested the soil in the vegetable patch. They found "highly elevated levels of lead" from sewage used as fertilizer. Evidently, Former President and First Lady Bill and Hillary Clinton, used treated sewer sludge as compost (http://www.examiner.com/article/michelle-obama-s-organic-garden-goes-to-waste-thanks-to-bill-and-hillary).

Solutions (AM)
Possible solutions for removal of chemical contaminants includes tertiary treatment options at the waste water treatment facility that is producing the sludge. In addition, sludge may also be incorporated into anaerobic digesters which would remove a majority of the organic pollutants present as well as produce natural gas as a byproduct. Following anaerobic digestion, the leftover sludge could be treated with organic acids, such as citric acid, which would remove heavy metals as well as prove to be environmentally favorable as citric acid is readily biodegradable (Veeken, 1999). The sludge derivative would still possess organic carbon sources that could be utilized by aerobic organisms, and therefore would meet both fertilizing need as well as pollution concerns.

Conclusion: (JL)
Even though the EPA and Sludge manufactures claim that biosolids are perfectly safe to use, they have a wide variety of regulations. However, these regulations aren't strictly enforced due to lack of manpower. The guidelines provided are relatively vague as exactly what to do. With insufficient knowledge of the topic, this is a recipe for disaster for uninformed farmers who use biosolids. As with most businesses there are loopholes that maximize corporate profits with little to no regard for the people and land. If farmers do not know the repercussions to using biosolids, they may be willing to take the “cheap” alternative to save some money. But is it really cheaper for them? Is it worth putting their kids, customers, as well as themselves in danger of being exposed to the hazards found in biosolids? By informing farmers of the dangers of biosolids, hopefully we can persuade them to not use biosolids.
If you eat any food, this issue should concern you. The food you are eating might be grown with biosolids. If plants and animals uptake the hazardous compounds found in biosolids and you eat them, you may potentially be exposed to the same hazards. I urge you to sign petitions to ban the use of biosolids in the States at http://www.centerforfoodsafety.org/issues/1044/rbgh/press-releases/929/cfs-files-petition-with-epa-to-stop-the-land-application-of-sewage-sludge# and http://petitions.moveon.org/sign/the-new-epa-administrator. For additional information visit http://www.usludgefree.org/ and http://www.organicconsumers.org/sludge.cfm.

Community Action: Informing unaware farmers. (JL)

In order to inform farmers, a list of potential farmers was located. Research was conducted online in order to find many farmers throughout the state of New Jersey. These farms included a wide variety, ranging from small organic farms to larger industrial sized farms throughout all of New Jersey. After the potential list of farmers to contact was generated, a questionnaire was developed in order to analyze if farmers were aware of what they were putting onto their agricultural land. At the conclusion of the questionnaire, farmers were provided via E-mail with a information packet containing several PDF’s with critical information regarding biosolids. The results and format of the survey are provided below.

“Hello, my name is _____ and I am a student researcher at Rutgers University studying soil amendments. Are you the person in charge of __________(If you get someone other than the farmer in charge, ask to speak with him/her). I am conducting a short questionnaire that will only take a few minutes of your time.

Questions (JL)

Do you apply any soil amendments, such as fertilizers or pesticides, to your land?
Have you ever heard of a type of fertilizer marketed as “biosolids”?
Do you apply biosolids to your land?
Have you experienced any difficulties since the application of biosolids?
Where do you get your biosolids from?
Are you aware of the regulations involved in using biosolids?
Are you aware if the possibility for metals as well as organic contaminants to accumulate on your land as a result of the use of biosolids?
Are you aware of the potential for these chemicals as well as biological agents to accumulate in crops/animals as a result of using biosolids on farmland?
Have you or do you express concern when considering the potential for humans to be exposed to chemicals as well as biological agents as a result of using biosolids?

Closing,

Biosolids or Sludge is considered anything that is semi-solid and a byproduct of wastewater and sewage treatment. Sludge contains a variety of hazards including various chemicals including carcinogens, endocrine disruptors, and heavy metals. In addition, if not treated properly, biosolids may also contain human pathogens. If you would like more information about the potential hazards of biosolids we can send you an information packet via email. We appreciate you for your participation in the survey and thank you for your time.
Relevant PDF’s sent.
http://njaes.rutgers.edu/pubs/publication.asp?pid=E228 (General Guideline and facts PDF)
http://njaes.rutgers.edu/pubs/publication.asp?pid=FS952 (Regulation PDF)
http://njaes.rutgers.edu/pubs/publication.asp?pid=FS955 (Heavy Metals PDF)
http://njaes.rutgers.edu/pubs/publication.asp?pid=FS957 (Organic Contaminants PDF)
http://njaes.rutgers.edu/pubs/publication.asp?pid=FS958 (Pathogen PDF)

### Results (JL1-10, AM11-20, AH21-30)

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**Discussion (JL)**

Our sample pool consisted of variety of farmers throughout NJ. However, some of these farmers are on a smaller scale and have a tendency to farm organically. Thus results might be potentially different in contrast to larger agricultural states such as Kansas and Iowa. In our poll, approximately a third of the farmers polled have heard of biosolids. Out of that portion, only 3 of them actually applied biosolids to their property. The vast majority of farmers in New Jersey who were surveyed did not use or have even heard of biosolids. Among the farmers who actively apply biosolids to their land, they were relatively informed about proper application and regulations of biosolids. This goes to show that not many people know about the presence and hazards of biosolids. At the end of the questionnaire, a information packet regarding biosolids was offered in hopes to properly inform farmers about the potential hazards and mistakes they could be making by applying biosolids. With their new found knowledge, we hope that farmers will continue their environmentally safe methods of farming and avoid toxic sludge use.

**Reference List:**


Appendix: (JL)
1. Asbury Village Farm – Asbury NJ
   Steven Zwier
   10 Asbury Bloomsbury Rd
   Asbury, NJ 08802
   Warren County
   States
daytime phone: 908 537 0777

2. Beach View Farms – Manahawkin NJ
   Chris Adams
   178 Beachview Ave
   Manahawkin, NJ 08050
   Ocean County
   States
daytime phone: 609-661-2240

3. Caristi Farm – Blairstown NJ
   Anne Marie and Joseph Caristi
98 Belcher Rd.
Blairstown, NJ 07825
Warren County
States
daytime phone: 908-362-7650

4. DanaRay Farm – Branchville NJ
Dana/Ray Eisele
349 Mattison Reservoir Avenue
Branchville, NJ 07826
Sussex County
States
daytime phone: 973-948-0906

5. E.J. Schoolyard Garden – Surf City NJ
Ethel Jacobsen Elementary School Long Beach Island Consolidated School District
200 Barnegat Ave
Surf City, NJ 08008
Ocean County
States
daytime phone: 609 494 2341

6. Fresh as it gets Gardens – Wantage, NJ
Shawna Bengivenni
31 Clove Road
Wantage, NJ 07461
Sussex County
States
daytime phone: 973.209.7770
evening phone: 973.670.0895

7. Golden Promise Apiary, LLC – Bridgeton NJ
Richard Hoglen
205 Lebanon Road
Bridgeton, NJ 08302
Cumberland County
States
daytime phone: 609-501-8231

8. The Farm at Natirar – Peapack NJ
Kim Wojtowicz
2 Main Street
P.O. Box 331
Peapack, NJ 07977
Somerset County
States
9. Tomenchok Farms – Lambertville NJ
   Robert Tomenchok
   145 Rocktown-Lambertville Road
   Lambertville, NJ 08530
   Hunterdon County
   States
daytime phone: (215) 785 6200
evening phone: (609) 397 7845

10. Burlington County Farmers' Market
    Phone: (856) 642-3850 / Barbara Flanagan,
    Email: bflanagan@co.burlington.nj.us
    Web site: burlcoagcenter.com
    500 Centerton Road, Moorestown. NJ 08057

11. Chesterfield Healthy Community Farmers' Market
    Phone: (609) 915-6435/ William Curry
    Email: WTC Curry@gmail.com
    Saddle Way, Chesterfield, NJ 08515

12. Delran's Farmers' Market
    Phone: 856-255-5685 - Lona Pangia
    Email: LPangia@delrantownship.org
    Web site: www.delrantownship.org/
    900 Chester Avenue, Delran, NJ 08075

13. Kirby’s Farmers Market
    Phone: (609) 654-4312 - Sarah Kirby
    Email: sarah.kirby@kirbybros.com
    Web site: www.kirbybros.com
    67 N. Main Street, Medford, NJ 08055

14. Atlantic Highlands Farmers Market
    (732) 872-8711 - Chuck Lero or Mary Thompson,
    Email: info@atlantichighlands.org
    Web site: www.atlantichighlands.org
    111 First Ave., Veterans Park, Atlantic Highlands, NJ 07716

15. Downtown Freehold's Farmers Market
    Phone: (732) 333-0094 - Christina DeGulis
    Email: tina@downtownfreehold.com
    Web site: www.downtownfreehold.com
    Hall of Records, 1 East Main Steet, Freehold, NJ, 07728
16. Galleria Red Bank Farmers Market  
Phone: (732) 530-7300 - Jimmy, Ted, & George,  
N/A

17. Giamano's Farmers Market  
Phone: (732) 775-4275 – Steffan  
Email: sourlisinternational@gmail.com  
Website: www.TheGalleriaRedBank.com  
2nd Bridge Avenue, Red Bank, NJ 07701

18. Highlands Farmers' Market  
Phone: (732) 291-4713/ Carla Cefalo-Braswell  
Email: hbp@highlandsnj.com  
Web site: www.highlandsnj.com  
Bay & Waterwitch Avenues (Huddy Park), Highlands, 07732

19. Keyport Farmers Market  
Phone: (732) 739-5138/ Bobbi Henniger  
Email: kbbc@keyportonline.com  
Web site: www.visitkeyport.org  
Fireman's Park, W. Front St., Keyport, NJ 07735

20. Manasquan Farmers' Market  
Phone: (732) 223-8303/ Laura Gilardini  
Email: info@manasquanchamber.org  
Web site: www.manasquanchamber.org  
Corner of Main St. & Miller Preston Way, Manasquan, NJ 08736

21. The Asbury Park Carousel Farmers Market  
Phone: (732) 686-9735/ Leslie Feingold  
Email: alverbena@aol.com  
Web site: www.foodforthoughtap.com/  
First & Ocean Avenue (on the boardwalk), Asbury Park, NJ 07712

22. West End Farmers Market  
Phone: (732) 539-3999 - Jesse Novak  
Email: jessescafe@yahoo.com  
Web site: www.restaurantpassioon.com  
Corner of Brighton & Kossik (west end section), Long Branch, NJ 07740

23. Bernardsville Farmers Market  
Phone: (908) 953-0161/ Ed English  
Email: ed.english16@gmail.com  
Rt. 202 & Claremont Road, Bernardsville, NJ 07924
24. Bound Brook Farmers Market
Phone: (908) 894-0515 - Karen Fritz
Email: kfritzcd@aol.com
Main Street, Bound Brook, NJ 08805

25. Downtown Somerville Farmers Market
Phone: (908) 541-1600/ Jay Scott or Mary Ann Reh,
Email: maryann@findsomerville.com
Web site: www.FindSomerville.com
Grove Street between Main and East High Streets, Somerville, NJ 08876

26. Manville Farmers Market
Phone: (908) 722-0121/ Oscar
Main Street, Manville, NJ 08835
27. Montgomery Friends of Open Space Farmers Market
Phone: (908) 359-4787/ Lorette Pruden,
Email: info@montgomeryfriends.org
Web site: www.montgomeryfriends.org
Village Shopper Parking Lot, 1340 Rt. 206, Skillman, NJ 08558

28. North Plainfield Farmers Market
Phone: (908) 723-1480/ Paul Ailrangues
Email: pma1963@aol.com
Web site: www.facebook.com/NorthPlainfieldFarmersMarket
264 Somerset St., North Plainfield, NJ 07060

29. SMC Farmers Market
Phone: (908) 685-2200 x4035 /George Sonkoski
Email: gjonkoski@somerset-healthcare.com
30 Rehill Ave., Somerville, NJ 08876

30. Olde Lafayette Village Farmers Market
Phone: (862) 703-6687/ Kay Weingrad
Email: lafayetevillagemarket@gmail.com
Web site: www.lafayettevillageshops.com
75 State Route 15, Olde Lafayette Village, Lafayette, NJ 07848

Letter to the Editors:
Sent to: Newark - Star ledger eletters@starledger.com
The Press of Atlantic City @ letters@pressofac.com
Home News Tribune in Central New Jersey hntletters@mycentraljersey.com

Dear Mr. Tom Moran,
Please consider my post for publication, and if you have any questions I can be contacted at:
I have recently been made aware of the use of sludge, a byproduct of wastewater treatment, as fertilizer. Sludge used for fertilizing is dehydrated and subsequently heated to remove pathogens; however, sludge is not treated for harmful chemical compounds before its application on land. The toxicity of sludge varies depending on the inputs to the wastewater treatment facility that the sludge is derived from, and generally includes a variety of heavy metals, carcinogens, and endocrine disruptors. Furthermore, both metal contaminants and organics are subject to uptake by crops as well as animals and thus may pose as an exposure pathway to humans. In addition, some of these pollutants are persistent and will accumulate over time presenting significant environmental concerns.

More stringent testing and processing of sludge is necessary for the safe application of sludge as fertilizer. Treatment for metals in sludge can be accomplished by treating sludge with organic acids prior to distribution and use. In addition, sludge could potentially be used in anaerobic digesters which would ultimately reduce the concentrations of harmful organics as well as generate energy from the process. More information on sludge application can be found at http://www.usludgefree.org/ and http://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/Sewage+S825.

Sincerely,
Anthony Murphy

Dear Editor for The Press of Atlantic City,

Please consider my email below for publication in your online press editorial section. If you have any questions or would like to contact me, please email me at: [Email] or call me at [Phone]. Mail can be sent to [Address].

I wanted to share some information regarding organic farming and the hazards of biosolids with your audience. Many people know about organic farming and organic foods, but most people do not about the existence of biosolids. Fertilizers are often used in farming to help improve growth of vegetation. Biosolids, which are a subcategory of fertilizer, are composed of recycled waste water sewage. Even though biosolids are treated and recycled, their compositions are still comprised of heavy metals, toxic chemicals, and pathogens. The repeated application of biosolids can pose potential hazards to the health of crops, farmers, as well as the surrounding environment over time.

Recently the White House's organic garden was declared non-organic because of sewer sludge. First Lady Michelle Obama's "organic garden" failed after the National Park Service tested the soil in the vegetable patch. Highly elevated levels of lead was found from sewage used as fertilizer. Evidently, Former President and First Lady Bill and Hillary Clinton, used treated sewer sludge as compost.

The reason biosolids remain invisible to the public eye is due to a lack of proper labeling and information. The biosolid lobby has had a strong influence in politics which allows them to avoid proper labeling. People can't obtain information on topics unbeknownst to them. The
Environmental Protection Agency (EPA) provides information and regulations of biosolid use at http://water.epa.gov/polwaste/wastewater/treatment/biosolids/. However, not many people are aware of the hazards of biosolids.

Rutgers University professor Dr. Julie Fagan and a group of student researchers, including myself, are assisting in the spread of useful information regarding the application of biosolids and educating farmers on how biosolid effect us and the environment. We urge farmers to do a little research into what compounds they are applying to their land. For anyone who would like more information regarding this topic, additional information is provided at http://usludgefree.org/, https://www.osha.gov/SLTC/metalsheavy/, and http://water.epa.gov/polwaste/wastewater/treatment/biosolids/index.cfm

Sincerely,
Joey (Joyce) Luh – Rutgers University senior student majoring in Biological Sciences

Dear editor of Home News Tribune,

Please consider my post for publication in your section of the online opinion editorial. If you have any questions, please contact me at [redacted]. You can also reach me on my cell: [redacted] or my home address: [redacted].

Recently, I have come to acknowledge the presence of biosolids, which are organic compounds collected from the purification of sludge. Sludge is formed in wastewater treatment plants; where water is able to be recycled and the leftover component is consider sludge. Now after the sludge purifies to biosolids, they are able to be reused mainly as fertilizers on farms. This becomes a cause for concern because these fertilizers include; high levels of metals which might be secretly damaging the crops, carcinogens and high risk of releasing hazardous compounds back in the environment. High levels of metals being consumed are dangerous for the plants and insufficient regulation may lead to a bigger disaster. What I suggest is that farmers should be notified and made aware that these situations can occur from lack of regulations. There also might be some cases where the farmer might unethically ignore the signs of these hazards and the people consuming the products from the farms may ultimately damage the consumers. Also treating the biosolids effectively from the start can reduce the levels of metals. Lastly, more information regarding effects of sludge and biosolids can be found on http://www.organicconsumers.org/sludge.cfm

Sincerely,
Ammar Hussain
Senior at Rutgers University