SARE Novel facilitation guide for dialogue groups

Intro Material: [Pass out informed consent form, and demographic information sheet]

Thank you all for coming to this discussion group in which we want to hear your perspectives on the use of various amendments including those derived from human waste for applications in farms, gardens and other landscapes. My name is Tatiana Schreiber – I'm the Social Research Director at Rich Earth Institute, and this is Gretchen Saveson who is a Research Associate at Rich Earth. We're passing out this informed consent form. I'll first just give you a moment or two to look that over and ask any questions. We'd also like to mention that we will not be connecting your names to your responses today in order to provide confidentiality; of course it's impossible in a small group and a small town to guarantee confidentiality, but please respect one another's privacy and refrain from mentioning specific people's names when talking about what we discuss today. For the $60 stipend, however, if you could put your address on the back of that consent form we'll know where to send the checks. We're also handing out a demographic information sheet – that information is optional but will help us characterize who we've included in the research.

First, I want to provide a little background about the amendments we'll be talking about. As you've all just participated in the field day, you may know much of this, but just to recap, human urine is naturally rich in the same key nutrients that synthetic fertilizers use to stimulate crop growth. Urine is a high nitrogen fertilizer with moderate levels of phosphorus and potassium, as well as secondary and micronutrients. [One thousand gallons of pasteurized urine contains the equivalent of 109 pounds of urea, 13 pounds of triple superphosphate, and 29 pounds of muriate of potash (KCl).] The N:P:K analysis is approximately 11:1:2.5. Farmers participating in research projects in Brattleboro over the past several years have had good results applying sanitized urine to hayfields without dilution, achieving yields comparable to synthetic fertilizers. Trials with hemp, sweet corn, figs and cut flowers have also yielded positive results.

In the past, we have conducted research on the fate of pharmaceuticals in urine fertilizer. We found that pharmaceuticals are sometimes taken up by crops, but in extremely small amounts - in the nanogram per gram range. This is similar to levels found in crops fertilized with animal manures or irrigated with treated wastewater plant effluent. Our understanding is that the scientific literature indicates these quantities do not represent a significant risk to human health.

Producing biochar [a form of charcoal produced at very high temperatures] from biosolids [solid product of wastewater treatment] may provide an opportunity to convert our human "waste" into a valuable soil amendment. It can increase soil organic matter in soils, help mitigate climate change, and improve crop production, while reducing the need for additional external inputs. The benefits of biochar are known to be enhanced further when biochar has been charged, inoculated, or blended with nutrient rich materials before use. Urine could serve that role. Using both the solid and liquid human waste products could be a way to reduce the need for external synthetic fertilizers and use both forms of waste simultaneously. The high-temperature conversion of biosolids to biochar has been shown in some studies to reduce many organic contaminants, including PFAS, by over 90% and immobilize heavy metals.

The goal of our conversation today is to better understand the perspectives of a range of people concerning the use of human urine and biosolids-derived biochar as potential soil amendments, as well as the types of indicators of soil health that are important to you. We have a number of questions we'll use to guide the discussion, but please also feel free to jump in if you have other things you want to talk about concerning these topics and feel free to respond to one another as the conversation continues.

Introductions: First, if you each just say your name and tell us if you would describe yourself as a farmer, gardener, or other way in which you're involved with land management.

Soil Health:

1. Thinking about soil health, how do you determine your fertility and soil health needs if you are a farmer or gardener? (Ex: soil tests? If so, how often, and what lab do you use?)

2. What are the most important indicators of soil health in your view? (Ex: plant health and yield; fertility; SOM; texture/tilth; microbial activity; other)
   Prompt: Tell us more about why that/those are important to you?

3. What fertilizers or amendments do you currently use?

    a. What would you say are the main factors that influence your decision to use these fertilizers and amendments? (Cost? Source? Effects on soil? Gardening philosophy? Other?)

Familiarity

4. We are interested in learning whether or not people are already familiar with the idea of [human] urine diversion or urine-recycling. Is this something that you have already heard about?

    a. [If yes]: What have you heard about this?
    b. [If yes]: How did you learn this information?

5. Similarly, with regard to biochar made from biosolids. Had you already heard bout this before today?
    a. [If yes]: What had you heard about it?
    b. [If yes]: How did you learn about it?

Potential Use of Novel Amendments (UDFs and Biosolids Biochar)

6. Do you see any potential positive aspects of using fertilizers and amendments derived from human urine and/or biosolids biochar?

7. What questions or concerns would you have about using urine-based fertilizers for crops or forage for animals, or other applications?

8. What questions or concerns would you have about using biosolids biochar? Would these differ from your thoughts about using a biomass-derived biochar?

9. For which crops [or other applications] would you be most likely to consider using:
    a) urine or a urine-based fertilizer on? Why?
    b) biosolids biochar?
    c) biomass-derived biochar?

10. For which crops would you be least likely to consider using:
    a) urine or a urine-derived fertilizer on? Why?
    b) biosolids biochar?
    c) biomass-derived biochar?

11. Are there other applications where you think these amendments could or should be considered?
    a) degraded landscapes/ecological restoration
    b) pollinator gardens

c) native plant nurseries
d) other?

Support/Info Needs

12. What information would be helpful for you to consider using urine-derived fertilizer? (Ex: information about costs, nutrient composition, data on yield, human health impact, soil health effects, effects on plant nutrient composition, concerns of fellow gardeners, regulations/permitting)

13. What information would be helpful for you to consider using biosolids biochar? (Ex: information about costs, nutrient composition, data on yield, human health impact, soil health impact, effects on plant nutrient composition, concerns of fellow garderns, regulations/permitting)

14. Is there other data or research results you would want to see?
Prompt: how many years of data would you want to see?

15.. What support would you need regarding the use of these amendments?
Prompts: (technical info, educational materials, appropriate application equipment)
Prompt: what form of information would be most useful (printed material, videos, podcasts)

Decision-making about using UDFs and biosolids biochar

16. Would you consider using urine or a urine-derived fertilizer if the costs were equivalent to a comparable fertilizer you currently use? If it cost more? If it cost less?

17. Would you consider using biosolids biochar if costs were equivalent to a comparable amendment you currently use? If it cost more? If it cost less?

18. Does your overall gardening philosophy or strategy affect your thinking about this? If so, how?

19. How would you think about urine and/or biosolids biochar compared to:
a) synthetic fertilizers
b) organic or natural amendments and composts
c) biomass biochar
c) biosolids (not charred)

d) digestates
e) other?

20. When thinking about risks or safety associated with use of a fertilizer or amendment, what forms of communication would be most helpful to you?

Prompts: Would it be useful for you to have comparisons to levels of microcontaminants present in other fertilizers and amendments?

21. Overall, what would it take for you to consider adopting one or both of these amendments (or a combined product)?

22. Do you think either of these amendments should be allowed under the USDA organic program?

[If yes]: Why? Do you have suggestions or recommendations for strategies with regard to obtaining organic certification for UDFs and biosolids biochar?

[If no]: Why not? What would it take for you to support these amendments being allowed under the USDA organic program?

23. Where do you get most of your information and advice about soil and nutrient management?

a) What do you think they [the source of information] would think about the use of urine or urine-derived fertilizers?
b) What do you think they would think about the use of biosolids biochar?
c) What do you think they [the source of information] would need to know to better be able to advise farmers on this practice?
d) Are you part of any farming organization [or other community of practice]? What information do you think it would be helpful for them to have about this practice?
e) How do you decide which sources are most trustworthy?

24. What do you think your fellow farmers/gardeners, or neighbors/friends would think about the use of urine-based fertilizers? Of biochar biosolids?

a. [If negative for either] What do you think would be the best way to address these concerns?

25. [if not addressed above]: What do you think your customers, if you sell or provide food to others from your garden would think about the use of urine-based fertilizers? Of biochar biosolids?

a. [If negative for either] What do you think would be the best way to address these concerns?

26. In order to make these practices more widespread, what issues do you think would need to be addressed?

Demographic Info [print out on a separate information sheet]

27. All of this information is optional, but for our research statistics, it would be helpful to know your:

a) age,
b) gender identity,
c) racial and/or ethnic identity
d) educational level, and
e) education/specialized training

Please write this on the sheets provided and we'll collect them…. [names are not necessary, but if you'd like to be put on our newsletter list, please include your contact information]