

Dr. Sara Via, svia@umd.edu

Dr. Sara Via's responses to questions asked during the webinar that were not able to be fully addressed in the live session.

Webinar Title: Sequestering carbon in agricultural soils: What works?

Question/Comment: Do cover crops give the same reduction every year? Wouldn't it be like going from Conventional to no-till where you only get the benefit once?

Answer: No, you get the benefits from no-till and all of the other annual practices every year that you use them. For the practices involving woody plants, you also get the benefit every year that the practice is maintained and in good shape

Question/ Comment: Does this show that the N₂O went up from moving from conventional tillage to no tillage?

Answer: I'm not entirely clear on why nitrous oxide increases in no-till, it may be because the microbial populations are larger and process more of the synthetic N fertilizer that is applied into N₂O. It appears that N₂O release depends on soil type, amount of aeration and moisture, and even the details of the rotation, which all make sense if it has to do with the microbial populations.

Question/ Comment: the CA Healthy Soils Program, farmers are given credit to on-farm composting for diverting organics from disposal. Will this be done in MD?

Answer: Possibly—we aren't there yet.

Question/ Comment: To what extent is re-incorporating livestock into agricultural systems part of the solution?

Answer: It can probably help but to me there are a lot of unanswered questions about exactly how to do it. I added a bit of additional information in the "Resources" document.

Question/ Comment: \$4 of diesel per pass? must be some heavy duty tillage, unsure how that metric is derived.

Answer: Take a look at the NRCS report in the Resources document provided on this website.

Question/ Comment: Verra - verified carbon standard, is approved methodology for quantifying carbon sequestration for carbon trading.

Answer: Thanks, I'll look into this.

Question/ Comment: Didn't your use of the multi year data require the assumption that C continually accumulates? Over time there must become a kind of saturation of OM, with an equilibrium struck between new OM added and older OM being decayed each year

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Answer: Because most agricultural soils are very depleted of carbon, accumulation is much faster than loss from storage (regular decomposition is not counted as carbon loss from the sequestration point of view). However, carbon sequestration will eventually level off as the soil saturates. Depending on the initial carbon levels, saturation takes several decades. Thus, sequestering carbon in soil is a temporary solution, best thought of as a way to buy time as we transition to a low-carbon economy. It is NOT a license to continue emissions.

Question/ Comment: What about carbon sequestration over time? Does it level off?

Answer: Yes.

And how much is lost if the practice is reversed eg if the no-till soil is again tilled?

Answer: Depends on the frequency and type of tillage. See the Conant ref in the resources I provided.

Question/ Comment: Can you talk about how sequestering Carbon through no till practices and especially silvopasture relates to increased methane from livestock? Do the two cancel each other out or is there an increase or decrease in GHG?

Answer: see the information I included about grazing in the resource document I provided. Silvopasture is great because trees store a lot of carbon in the wood, so this is an extra route for carbon sequestration in grazing that goes beyond just the grass. I'm all for silvopasture, but less enthusiastic about the various rotational grazing schemes. I put a bit more about this in the Resources document.

Question/ Comment: What about nutrient stratification in no tillage row crop systems?

Answer: Sorry, but I'm not sure what you mean by this.

Question/ Comment: I would like to hear why Sara doesn't think rotational grazing is not a strong part of the answer to carbon reduction.

Some of the reasons are on the slide that I didn't have time to discuss. It just seems to me that to make rotational grazing work, farmers need to be very knowledgeable and motivated. Also, it is unclear that all of the various types of rotational grazing actually work equally well—for example, although mob grazing and trampling of wastes into the soil is touted as a great solution, it also appears to lead to soil compaction. Also, my personal opinion is that we need to move away from beef in the diet, but this is largely irrelevant to the point of whether grazing helps sequester more carbon. See the Stanley paper in the resource list for a good study—we need more like this; I also added some additional info in that document.

Question/ Comment: In your opinion, why are more farmers not using farming practices which increase soil carbon?

Answer: Farmers have a lot to worry about and carbon sequestration is probably not at the top of most of their lists. However, the soil health benefits of these practices are attractive, and it the social benefits of carbon sequestration make it worth incentivizing using them. In my

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opinion, it's important to remember that no one segment of society is responsible for solving the climate problem. We all caused it.

Question/Comment: Are there potential problems with biochar from a contaminants point of view if generated from waste water treatment facilities? (heavy metals)

Answer: I'm sorry but I don't know the answer to this.

Question/ Comment: Wouldn't grass feed beef reduce GHG emission compared to grain fed due to the amount of diesel emitted in the process of farming the grain.

Answer: Yes, the emissions from producing the grain need to be taken into account, but there are many other factors as well, particularly emissions from the animals and the fact that the efficiency of feeding animals to produce meat for people to eat is very low. From purely an emissions standpoint, it would be better to grow crops to feed people and just skip the animals. The Stanley et al paper I mention in the Resources document discusses this and they included life cycle emissions in their comparison of grass fed and feedlot finishing.