Literature Review Discussion

**From:** Rahic, Elmin [A B E] <[erahic@iastate.edu](mailto:erahic@iastate.edu)>  
**Sent:** Wednesday, December 7, 2022 9:19 AM  
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**Subject:** Literature Review

Sorry for getting back to you all so late!  It looks like there were five of us interested in doing a joint lit review.  Below is the list of topics we have filled out in the google form:

* Anaerobic digestion technologies, biology, and trends; biomass pretreatment; biogas purification; biomass processing; bioprocessing.
* What feedstocks to use and the system inputs/activities to farm; the costs associated with each system (or at least the best way to characterize costs); supplysheds; impacts of those feedstock systems to wildlife, water quality, and GHG ecosystem services.
* Digestate application on soil organic carbon.
* material flow analysis, nutrient pollution, eutrophication, Chesapeake bay environmental issues, anaerobic digestion, codigestion dairy manure and herbaceous feedstock, renewable natural gas, life cycle assessment of anaerobic digestion, grasses, cover crops/double crops, food energy water nexus.

I think we have the diversity to cover a lot of topics for a lit review!  Does anyone have ideas or a desire for a specific topic that can cover at least one item from each of the bullet points above?  If so, please share!

**From:** Villarino, Sebastian H [AGRON] <[sh4@IASTATE.EDU](mailto:sh4@IASTATE.EDU)>   
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**Subject:** Re: Literature Review

Thank you Elmin!

Yes, this diversity of topics is great! This could lead to a good global view of anaerobic digestion technology. We should search if something like this is already done... but maybe an update of the topic with this broad approach is needed. I attached some review papers (biased to my topic). However, we could start with a shared folder. Everyone uses "Box" or have another preference? I we select Box, I can start organizing the folders.

Best,

Sebastian

I agree.  I did a quick search and I was able to find a somewhat recent paper (attached) looking at the global status of AD.  They included economic and environmental implications, as well as government policies, but in my opinion the paper seemed most focused on the government policies.  I think our group could bring a bigger focus on the technological, environmental, and ecosystems side of a farm-based AD system.  Also, what is everyone’s thoughts on trying to incorporate the FEW (food, energy, water) nexus into this paper?  It seems like a pretty hot topic now, and I think we may have a good level of expertise in this.

As for sharing papers, we could use the existing CCHANGE G2G box folder if we’re all comfortable with that.  Otherwise, we can just set up a new Box folder.

Best,

Elmin

**From:** de Lima Casseres dos Santos, Lucas <[lds5498@psu.edu](mailto:lds5498@psu.edu)>   
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**Subject:** RE: Literature Review

Thank you very much, Elmin, for coordinating this!

Also, thank you for sharing this paper. Cool fact, Dr. Juliana Vasco is in our department. My office is shared with her grad students. I am also sharing a [paper](https://www.sciencedirect.com/science/article/pii/S0960852421003400) in the same journal and will start checking some papers here to discuss those topics.

I am fine with using the C-CHANGE G2G box folder but creating a new one there. Also, if everybody uses Zotero, it is just another possibility of space.

Regarding the common topics of each bullet point, I am highlighting the ones that I am more curious about and have been looking.

* Anaerobic digestion technologies, biology, and trends;
* the costs associated with each system (or at least the best way to characterize costs); impacts of those feedstock systems to wildlife, water quality, and GHG ecosystem services.
* Digestate application on soil organic carbon.
* material flow analysis, nutrient pollution, renewable natural gas, life cycle assessment of anaerobic digestion, herbaceous feedstock, food-energy-water nexus.

I am looping Dr. Chris and DeWaunis in about it; they were also interested in helping with that.

Best,

Lucas

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**Subject:** RE: Literature Review

Hi everyone,

Thank you to all who were able to make it to the meeting yesterday.  For those who couldn’t, Abbie took some notes and put them in the CCHANGE Box folder (Lit Review Group folder).  There’s also a spreadsheet in that folder where we can start adding in papers with key details.  One sheet has already been started on anaerobic digestion and can be used as an example or rough template for our other areas of focus.

Have a great winter break everyone!

Best,

Elmin

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**Subject:** Re: Literature Review

Hello All,

I, Divya, Lucas and DeWaunis would like to join on a some topics, please!

Is there a plan to try to talk before break? If this is student-focused primarily I don't to be too involved, but Lucas, DeWaunis and I were just about to get started with a review on AD and Divya and I have been reading up on  all things to do with GHGs in agricultural systems with an emphasis on mathematical methods, which are used in policy to represent them, e.g., accounting for soil organic carbon accumulation, N2O emissions due to land management (life cycle assessment method type questions). We've got some pulled together.

If I could also put in my two cents, regarding: "They included economic and environmental implications, as well as government policies, but in my opinion the paper seemed most focused on the government policies.  I think our group could bring a bigger focus on the technological, environmental, and ecosystems side of a farm-based AD system.  Also, what is everyone’s thoughts on trying to incorporate the FEW (food, energy, water) nexus into this paper?  It seems like a pretty hot topic now, and I think we may have a good level of expertise in this."

FEWs for sure!! I look forward to hearing what you and others are thinking about there and have ideas too. My favorite nexus to ponder. 🙂

 A central question for my lab is...do we know enough to include the changes in C and N flows in this ag system through the AD system to create a generalizable carbon crediting approach?  And do we know enough to make a case for inclusion of ecosystem services within policy environments, e.g., Chesapeake Bay Watershed TMDLs etc. Particularly the carbon accounting is a super hot area right now, there is money and it will be spent on perennials or something else. This is really what LCA was initially about prior to the current hyperfocus on product declarations.

I don't disagree with anything you've written, Elmin, it's more of a yes, and. Yes, this large and amazing group of C-CHANGE people can are studying holistically the tech, enviro, and ecosystems, and, I think the USDA wants us to give recommendations and guidance/there is a good deal of funding and it's exciting to have it going to support perennials, etc.

Thank you for organizing this!

Chris

Jess, I'm so sorry to hear this news about your mom. Take care of yourself and her as best you can.

Elmin, et al., I filled out the poll. If finding a time is hard and/or everyone is crashing, perhaps some among us can get a spreadsheet started. If someone else made a link, I can enter an example to start. We can use Tom's AD articles as a start and make it a task to search a few more? I attached bibliography files in .rdf (Zotero) and .ris (I think works with Mendeley and Endnote, maybe Zotero too?).

**We briefly discussed a plan of attack in my group, which is to make a shared spreadsheet with columns to record key information, e.g., information about the material going into AD, tank sizes, CH4 production rates (per day), info chemical composition of digestate, operations specifications (meso-, thermophilic? pretreatment, HRT, solid state?), etc. Whatever you deem important.**

Then divvy up a specified list among us. Once that sheet if filled out we can discuss, group, analyze, and importantly have info to represent various options.

Thanks for keeping this moving!

Chris

I'm sure you've all be exposed to these things, but here are a few resources for thinking about structuring lit review.

**Types of literature reviews**:

* A listing of types: <https://libguides.uvic.ca/c.php?g=703754&p=5008012>

**Resources to review**:

* How To Write A Literature Review In 3 Simple Steps <https://youtu.be/lw8HPXJP1VA>
* [Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)](http://www.prisma-statement.org/) is a frequently used approach, though it was designed for the medical field and isn’t always relevant to our needs. [https://www.prisma-statement.org//](https://www.prisma-statement.org/)