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DATA PROJECTS WITH UNIVERSITY OF BRITISH COLUMBIA

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How does the GFLI database gain data?

Through this interview we'll dive deeper into this question often arising. Key collaboration to facilitate data projects is essential for the existence of GFLI, therefore we're very happy to dive into one of the LCA experts who is contributing to the GFLI database in such a way.

We sat down with Nicole Bamber PhD, researcher at the Faculty of Science (Biology) from the University of British Columbia (UBC), who researched the environmental footprint of multiple pulses in Canada & also contributed two of those datasets to the GFLI database. Learn more about the project, the value of gathering data, and why industry engagement is crucial!

Nicole Bamber
PhD reseacher

University of Britisch Columbia (UBC)

How did the project come to be?

First of all, Canadian farmers and growers associations are really proud of Canadian agriculture. There is a high emphasis of sustainable production, and pulses are ingredients that have a relatively low environmental footprint due to its nitrogen-fixing properties. The project was started in order to create a baseline or benchmark for some ingredients, with the choice falling on pea lentils and faba beans in the prairie region. Nearly all pulses are produced in this region, and because primary data was lacking for these products it was a good opportunity to showcase the product's environmental footprint.'

Nicole was positively surprised by how active the stakeholders were, stating that egg producers and Pulse Canada were very engaged. She had not seen such successes in other industries. She underlines the importance of this, *'in general there is some skepticism towards academia by farmers, so having them in the room to hold plenary discussions are crucial to combine the theory with the practical. This is also important for UBC, as we want to develop our connections with agriculture and feed companies more.'*

Tell us a little bit about the process of the project

For the lifecycle assessment (LCA), the ISO-14044 and 14040 was followed, which are the most common standards to execute a LCA. Data was collected by surveys that were send out to producers. *'Receiving responses to the surveys were a bit tricky. After my initial attempt of reaching out to individual farmers, we involved a third-party farmer's cooperative to increase responses. This allowed for a much higher uptake of the surveys, for which I modelled the obtained data and then filled the data gaps with secondary data. I've also used some of the Canadian HOLOS model for nitrogen emissions and other processes to complete the LCA. This government software model works towards including all scope 1 and 2 field data, as well as scope 3 emissions into their tool.'*

One of the data gaps encountered was how much fuel was used for specific fields [information: pulses are commonly produced in a rotation cycle between other crops like grains to replenish the soil]. Using field tests we made assumptions on the allocation of energy use towards specific crops. It would be desirable to follow-up with the producers in order to track this in future years for a clearer picture.'

Soil carbon accounting

One of the research topics was the accounting for soil carbon and its sequestration. The GFLI methodology does not yet include such an approach due an absence of globally acknowledged metrics within LCA practices. This was also encountered by Nicole. *'It is indeed difficult, there aren't great measurement tools for it at the moment, and the range which models produce results vary greatly. We modelled it with two different models, the IPCC tier 2 modelling approach, and DeNitrification DeComposition (DNDC) model, to compare the differences.'*

GFLI database

GFLI datasets are commonly gathered through two possible ways.

One, the data project is specifically done for inclusion into the GFLI database, meaning the project is all catered towards the requirements of the GFLI.

Two, the lifecycle assessment is already gathered and executed based on other standards (such as ISO standards mentioned in this article), whereas the data provider finds out about GFLI at a later stage and wants to include it.

Usually the second option has a more intense review process because of the different requirements that may not have been considered due to the granularity of the GFLI methodology compared to general standards.

The Canadian National Inventory Reports allow for the IPCC tier 2 models, which is also integrated into the Canadian HOLOS model. Nicole recommends for GFLI to investigate whether this could be included in its methodology as a higher tier approach. When asked how to approach this integration, Nicole shares: *'it would be safe to report an environmental footprint with and without soil carbon as long as it is communicated that the variability may be high. For research and certain projects, such estimates would already be very helpful.'*

Do you have any recommendations for GFLI to improve the integration of data, based on your experience following the procedures?

Nicole shared her thoughts about the modelling processes. *'The aforementioned soil carbon accounting would be an example, as well as the overarching approval of higher tier modelling such as N_2O which was the case in this project. Allowing higher tier models is very relevant due to the efforts from national researchers to gather the additional datapoints for it (this allows for calculations with the best available data).'*

'Due to how broad the ISO standards are, the guidance the GFLI methodology provides is useful. In future projects it'd be great to have it available when starting a project, as that was not the case in this project. I'd also love to see a comparison with all the different methods, such as EPDs, EcoInvent, GFLI. The value of GFLI as a recognized methodology and modelling approach is useful to avoid remodeling exercises.'

About the GFLI sampling size, she says, *'A discussion we had during the internal review with GFLI, was about sample sizes. It was difficult to comply as in research you're highly reliant on the primary data sourced, and in our case there was not much secondary data available either. From a research perspective, you'll always want to rely on the best available data. More data collection efforts would overcome that issue, but currently it is difficult to gather enough data.'*

"The value of GFLI as a recognized methodology and modelling approach is useful to avoid remodeling exercises."

Lastly, for people interested in a career in LCA, could you share your journey of how you got into it?

'I've started my bachelor's in biology and nutrition. I've had affinity with sustainable production due to my upbringing on an 'off grid' home. For my PhD, I was interested in the optimisation of the nutritional value of (human) foods, and I wanted to add sustainability or restorative practices as an added layer towards that research'. Thanks to the opportunity given to me by UBC, I am now a researcher in this field.'

UBC currently houses its LCA expertise within the biology department, therefore the combination seemed to work out excellently. They've developed a new bachelor's study program in sustainability where the LCA research will fall under in the future.

'Within the department, we are working on a couple of interesting projects related to LCA. One is collecting data from malt barley producers, pulse wet and dry fractionation of flour and protein, GHGE in soils variable rate of fertilizer rate of test field vs modelled data. We're also working on automizing code to simplify LCI data collection for OpenLCA software on Python-based code. My lab, the Food Systems PRISM Lab at UBC – led by Dr. Nathan Pelletier – welcomes any LCA research collaborations, as well as inquiries from potential graduate students. If any of this seems interesting to you, please check out our website prismlab.weebly.com.'

Overview

The article features an interview with Dr. Nicole Bamber from the University of British Columbia (UBC), highlighting her research on the environmental footprint of Canadian pulses and her contribution of datasets to the Global Feed LCA Institute (GFLI) database. It details the collaborative process between academia and industry, the challenges of collecting primary data from farmers, and the use of lifecycle assessment (LCA) standards and models like ISO 14044/14040 and the Canadian HOLOS model. The article discusses the complexities of soil carbon accounting, the importance of industry engagement, and recommendations for improving GFLI's data integration and methodology. It also emphasizes the value of university partnerships for high-quality data and encourages broader participation in GFLI's initiatives to strengthen sustainability efforts in the feed sector

We extend our sincere gratitude to Dr. Nicole Bamber for her valuable insights and the University of Britisch Columbia (UBC) for their contribution to this article.

Is your company the next Data-in project?

Data-in projects are essential for the growth of the GFLI database, so we've very pleased Ms. Bamber was able to shed some light into the process. The collaboration with Universities for high-quality and representative data, as well as higher tier modelling approaches to align with National Inventory Reports is very relevant. These insights help us improve and create a structural data influx to provide the supply chain with high-quality and representative feed emission data.

If you also have any data or want to collaborate with GFLI for data, please reach out to us via info@globalfeedlca.org!