Towards the global reference for Feed LCA data: the Global Feed LCA Institute

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ABSTRACT

The feed and livestock sector need to measure its impact on the environment in order to identify mitigation options. Harmonised methodology and robust data are required for that purpose. The Global Feed LCA Institute (GFLI) is a feed industry initiative is a feed industry initiative with the vision to develop a freely and publicly available feed LCA database and tool. This is seen as a key input to support environmental assessment of livestock products. This paper provides an overview of how the Global Feed LCA Institute intends to achieve its objectives and the challenges it has to face. It describes the governance mechanism which has been put in place by the GLFI in order to achieve global geographical coverage but also focuses on the methodological aspects associated with the development of the GFLI database.

Keywords: animal feed, environmental footprint, database, global consistency, free access,

1. Introduction

Environmental footprinting of livestock products is a challenging but essential task to improve the accuracy of reporting on the real impacts of livestock products. This includes both understanding where the livestock chains in terms of impact and encouraging the benchmarking and measurement of both individual and collective reduction efforts. According to the Food and Agriculture Organisation of the United Nations (FAO), feed production represents 45% of the carbon footprint of livestock products globally. This share is even higher for monogastric animals. This shows that animal feed is an important part of the chain and it is essential that feed operators are able to understand their impact, not only from a business efficiency perspective but also to meet the expectations of their customers and public bodies, at national and international level. This also shows that high quality secondary data for feed is a critical requirement to achieve high quality environmental assessment of animal products. Considering the complexity of the feed supply chains it is indeed almost impossible to assess the environmental impact of feed products by relying only on primary data. The nature of the feed supply chains is global, which means that the methods and data need to be global as well.

To this end, the Global Feed Life Cycle Assessment Institute (GFLI) is a feed industry initiative with the vision to develop a freely and publicly available feed LCA database and tool. The GFLI's objective is to support meaningful LCAs of livestock products and enable to benchmark feed industry environmental impacts. The GFLI was officially launched in January 2016. The GFLI is seen as long term organisation, with a first set of deliverables scheduled for the end of 2017. The GFLI will implement the methodology developed by the Livestock Environmental Assessment and Performance partnership (LEAP) led by the FAO.

This paper provides an overview of how the Global Feed LCA Institute intends to achieve its objectives and the challenges it has to face. The first section of the paper describes the governance mechanism which has been put in place by the GLFI in order to achieve global geographical coverage. The second sections looks at the methodological aspects associated with the development of the GFLI database whereas the third section provides some insights on how the deliverables of the GFLI will be disseminated.

2. Governance approach

Developing a truly global database is an ambitious and challenging objective. This task cannot be performed by a single organisation, since it would be able to provide all the necessary expertise and knowledge. The pressure to be active in the area of environmental footprinting, be it an institutional pressure or a market pressure varies also significantly across the different world regions. The GFLI should therefore enable pioneers and front runners to get involved as soon as possible but also stimulate stakeholders or world regions which are currently less interested or less concerned by the GFLI activities to join. It is indeed important to avoid creating a gap between the different regions of the world for the development of the GFLI database. In addition, the different stakeholders and the different regions of the world may have different expectations regarding the GFLI database, in particular relative to the level of detail it should provide. This element should also be factored in the GFLI governance mechanism.

To deal with these challenges, the GFLI set up an innovative governance mechanism based on regional projects, which will populate the common database. These regional projects are led by a consortium of feed companies and feed associations which constitute a Project Steering Group. It is necessary to join a Project Steering Group, i.e. to contribute to a regional project, in order to become a member of the GFLI. Joining a regional project implies adhesion to the GFLI vision and objectives mentioned in the GFLI framework agreement signed by all members. Instead of a regional approach, a Project Steering Group can also be based on a sector, with particular needs in terms of data. This is for example the case for the fish feed sector, for which discussions have started to develop a specific project within the GFLI. The GFLI activities can therefore be split in two categories:

- The common activities, which benefit to all members: establishing the database infrastructure, developing the procedure for data collection and compiling the data collected by the regional projects in the common database
- The regional (or sectoral) activities, i.e. the collection of data for a given world region or sector

The different Project Steering Groups are responsible for financing the regional or sectoral activities, but each member of the different Project Steering Groups also contributes financially to the common activities of the GFLI. The Project Steering Groups are also autonomous to determine their internal governance rules.

Within the GFLI, all the Project Steering Groups follow the same methodology and the same procedure for data collection (see section 3) which ensures global consistency. There are currently two operational Project Steering Group: one for Europe and one for North America (USA and Canada). They are composed of the following members, which are either feed companies or feed associations:

- Europe Project Steering Group: AB AGRI, Agrifirm, AIC, Bemefa, Cargill Animal Nutrition, Evonik, FEDIOL, FEFAC, For Farmers, Nevedi, SNIA, Nutreco, USSEC

- USA/Canada Project Steering Group: AFIA, ANAC, ADM Alliance Nutrition, Alltech, Cargill Animal Nutrition, CHS Nutrition, Diamond V, Elanco Animal Health, Evonik, Hi-Pro Feeds, LandO'Lakes Purina, Mosaic Feed Ingredients, National Soybean Board, Potashcorp

Discussions are currently taking place to launch regional activities in China later in 2016, but also in Brazil and Australia.

The executive body of the GFLI is the GFLI Management Board, which oversees and coordinates the activities of the Project Steering Groups.

It is up to the different project Steering Group to determine the list of feed ingredients for which data will be collected and brought to the GLFI. This has to be done from the perspective of compound feed production, which means that imported feed ingredients and the related logistics have also to be taken into consideration. (e.g. soybean meal for EU compound feed production). Dealing with imported feed ingredients may lead to an overlap between regional projects. To ensure synergy between the regional projects the following principles apply:

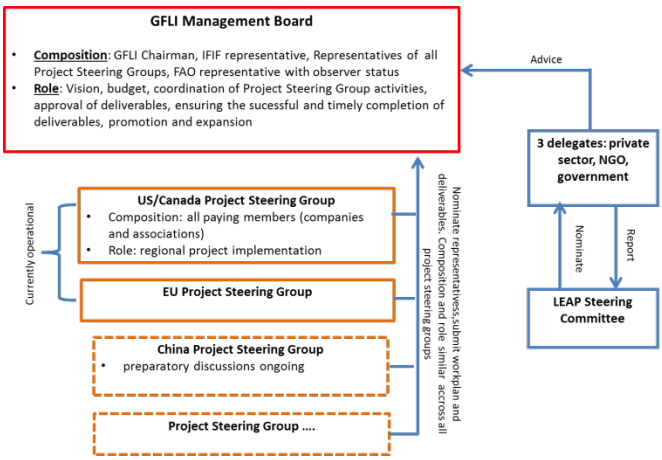
- Data collected by a regional project for processes within their regional scope, takes priority over data collected by other regional projects. For instance, a South American project is in the lead for deriving soy cultivation data in Brazil. Other regions that would like to use data of soybean from Brazil shall use the data that are brought in by the South American project.

- However, when no data is collected for a specific region (i.e. a region has not yet joined the GFLI project), other regions may collect data for that region. For example, the European project may include soybean cultivation from Brazil in lieu of data collected in a South American project.

- If a region starts collecting data of feed ingredients in scope for its consumption, it should first determine if data that are already collected by other regions overlap with the scope of their data collection.

Coordination is necessary between the activities of the regional projects. This role is facilitated by the GFLI Management Board, which is executive body of the GFLI. The main responsibilities of the GFLI Management Board are to implement the GFLI vision, to monitor the budget, to coordinate the Project Steering Groups activities, to ensure a successful and timely completion of the deliverables and to promote and expand the GFLI. The GFLI Management Board is composed of representatives of the regional projects, a chairperson which does not represent any project and a representative of the International Feed Industry Federation (IFIF). The LEAP Partnership is also sitting in the GFLI Management Board with an observer status, to facilitate alignment with the LEAP recommendations. Within the GFLI Management Board, decisions are based on consensus. The governance of the GFLI is summarized in the figure below.

Figure 1: GFLI governance mechanism



3. Methodological approach

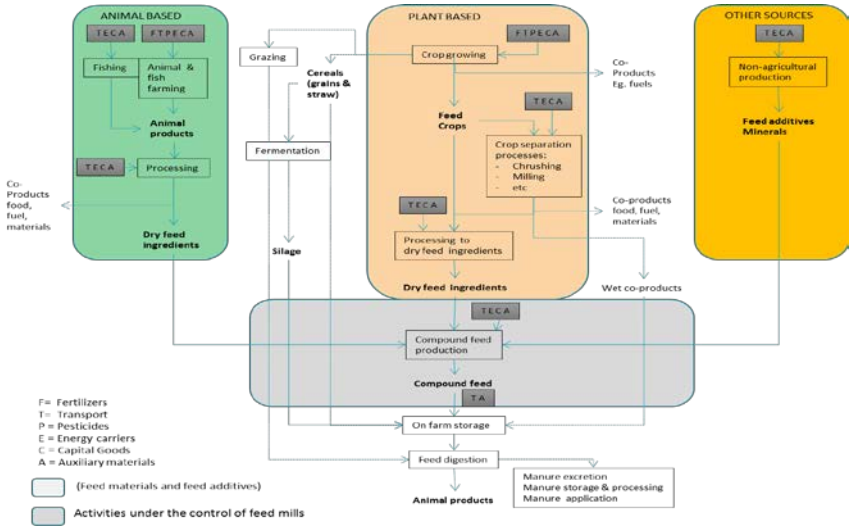
From a methodological perspective, developing a global and consistent database is another challenge, especially when the task of collecting data is split across different groups of stakeholders which also use different sources of information. The consistency of the data should be addressed at two levels: the consistency of the datasets themselves, but also the consistency for the definition of the scope of the activities of the regional projects, i.e. the list of datasets that the regional projects will work on.

a. Consistency of datasets

For the consistency of the datasets, the GFLI mainly relies on the methodological recommendations provided by LEAP in its guidelines for the assessment of the environmental performance of animal feeds supply chains.

The GFLI activities are conceived as a module to support the environmental assessment of animal products. The GFLI database will therefore follow a cradle to gate approach. The system boundaries considered for the GFLI activities are described below. It includes the production of the different types of feed ingredients (from plant origin, from animal origin and from non-agricultural sources) as well as the feed-mill related activities (processing of feed ingredients and feed delivery to the farm).

Figure 2: System boundaries of the GFLI database



The LEAP guidelines provide detailed information regarding the activity data which shall be collected as part of the life cycle inventory for the following life cycle stages: cultivation (including land use change and assimilating animal production and fisheries to cultivation); processing of feed materials, compound feed production and preparation of animals' ration. The decision tree provided in the LEAP Guidelines can also be used for allocation. Following the LEAP recommendations, the GFLI will consider economic allocation as the baseline option (especially for the processing of feed materials). The GFLI database will however include three types of allocation (economic, energy and mass) in order to facilitate sensitivity assessment and to ensure that the influence of allocation in the results is properly taken into account.

Being able to rely on the GFLI database in the context of the Environmental Footprint (EF) initiative launched in 2013 by the European Commission is another objective of the Global Feed LCA Institute. As far as the methodology is concerned, this means that the GFLI database will support the impact assessment methods currently listed in the Product Environmental Footprint (PEF) Guide, as a baseline (this objective triggers also consequences on the infrastructure of the database and the underlying documentation). It is however possible for regional or sectoral projects to consider additional impact assessment methods which may be more relevant for a specific or regional context.

As already mentioned, the GFLI is an ongoing project. It means that several methodological aspects still need to be clarified. This is particularly the case for the identification of proxies, in case of data gaps but also to achieve a harmonised yet simple way of assessing the quality of the data brought by the regional projects to the GFLI. The GFLI is assessing the opportunity and feasibility to use the Data Quality Rating system currently employed in the EF pilot phase as starting point for data quality evaluation.

b. Consistency among regional projects

The GFLI governance mechanism offers some useful flexibility but is rather decentralized. The inherent risk with this approach is to end up with inconsistent choices made by the regional projects. To reduce this risk, the GFLI has defined a road map which shall be followed by the regional projects for their activities

Table 1: GFLI road map for data collection

Step 1	Define the list of feed ingredients which are relevant in order to perform a meaningful assessment of the environmental impact of compound feed for the region/sector at stake.
Step 2	Literature review and methodological compliance check
Step 3	Define data collection and update plan
Step 4	Identify synergies / overlap with other regional projects
Step 6	Start collection/update of LCI
Step 7	Organize an external review of the collected/updated data to check compliance with data collection procedure
Step 8	Submit data to the GFLI management Board

A consistent approach to define the scope of the regional projects is also extremely important for the objectives of the GFLI. The scope of the regional project are defined from the perspective of a compound feed producer in a given region, meaning that the list of feed ingredients for which data will be collected should enable meaningful environmental assessments. To achieve this consistency, the GFLI has come with another stepwise approach which supports the decisions to be taken by the regional project.

- Step 1: divide the list of ingredients into consistent groups of ingredients.

This grouping of ingredients is applicable for all regional projects. For each of the groups, a mass threshold relative to consumption by the compound feed industry has been defined and all the feed ingredients which contribute to this threshold (in decreasing order) shall be included in the scope of the regional projects. With this approach, it becomes mandatory for regional projects to collect data for a broad range of feed ingredients, which increases the possibility to conduct meaningful assessments. The groups and the respective thresholds are listed in table 2

Table 2: list of groups of feed ingredients and mass threshold to be considered by regional projects to define the scope of their data collection activities

Group	Threshold (mass)	Group	Threshold (mass)
Cereals (unprocessed except drying)	95%	Products of animal origin	50%
Root products (tapioca, sugar beet, etc…): processed and unprocessed	90%	Dried forages	50%
Processed cereals products	90%	Pulses	80%
Vegetable meals	95%	Minerals	50%
Vegetable oils	95%	Additives (vitamins, enzymes, amino-acids)	50%
Other co-products from the food and fuel industries	80%	Other	Voluntary threshold

The example below illustrates how this grouping and threshold approach can be implemented in practice. Based on public statistics but also on expert judgement, the consumption of cereals by the EU compound feed industry is estimated as follows.

Table 3: Breakdown of cereals consumption by the EU compound feed industry (source: FEFAC)

Cereal type:	Share in feed sub-group cereals:	Cereal type:	Share in feed sub-group cereals:
Common wheat	31%	Rye	2%
Maize	30%	Sorghum	1%
Barley	25%	Durum wheat	1%
Triticale	5%	Other cereals	2%
Oats	3%	Total	100%

The threshold defined for cereals in table 2 is 95%. It means that life cycle inventory data shall be collected for wheat, maize, barley, triticale, oats and rye.

- Step 2: identify animal species that are important for the region/stakeholders in the regional project and identify feed ingredients specific to these species.

A regional project may decide that a certain animal species is particularly relevant. If it does not represent significant volume of compound feed production and if it requires specific feed ingredients; these ingredients will not be necessarily identified in step 1. The regional project can then decide to include these ingredients in its scope, based on expert judgement. An example is the veal production using feed ingredients of dairy origin which represents a small share of the ingredient consumed by the compound feed industry.

- Step 3: identify other missing ingredients.

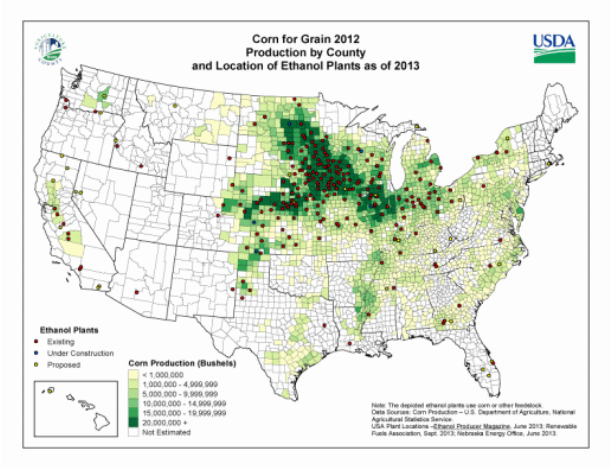
If needed, the regional project board may decide to employ additional criteria to add even more ingredients to their list. These can for example be ingredients that currently do not have a large share in feed formulations but are foreseen to become more dominant in the near future. Also feed ingredients that have a small share but seem to be environmentally beneficial and could be used to improve current feeds may be included. Conversely, ingredients that have a very small share, but are

regarded to be environmentally harmful (based on previous experience or information from other regions), may be included.

- Step 4: subdivide the list of ingredients into ingredient/origin combinations.

The region for which a dataset will be defined and implemented in the GFLI database can be large. In many situations this region consists of smaller units such as countries, states or provinces, etc. The appropriate geographic level of detail depends on the relevance of having detailed data available on the basis of expected contribution in overall LCA results and potential variability. The appropriate level of geographic granularity is not necessarily the same for all feed ingredients. Furthermore it is important to gain understanding of how the production of a feed ingredient is regionally distributed over its different life cycle stages. This is illustrated by the figure 3 which maps cultivation of corn and production of ethanol in the United States.

Figure 3: corn production and ethanol processing in the United States (source: USDA)



Such an analysis can be used to focus further on specific sub-regions but also to determine average transport scenarios (distances and means). The subdivision can be thus be based on for example ingredient-country combinations (soybean meal crushed in the Netherlands), but could also be on a state level (almond hulls, California), depending on what data resolution is available. For each identified ingredient, the specific regional coverage of the ingredient country combinations should be as large as possible (>90%). Origins contributing more than 5% shall also be included. The analysis can be done on the basis of import/export and consumption statistics (sources could be the UN COMTRADE database, FAOstat, PRODCOM EU statistics, trade.gov or other regional/national statistics) or other sources of information (reports, scientific literature for a specific ingredient).

- Step 5: remove ingredients for which it will practically infeasible to collect data.

At this stage, the list of feed ingredients may be quite long. The possibility is therefore given to regional projects to remove ingredients from the list to cope with constraints such as in case lack of access to data, or budget limitations.

4. Dissemination and use

The ambition of the GFLI is to become a reference for Feed LCI data. It means that in addition to the database development, the GFLI should also consider how to facilitate access to the data. One key element from that perspective is the GFLI decision to offer free access to its database. Another important element is LCA software neutrality. The GFLI objective is to develop its database in a format that can easily be picked up by the main LCA software developers. To this end, the GFLI is monitoring closely the UNEP/SETAC initiative on interoperability of LCA databases. While waiting for the outcomes of this initiative, the GFLI will consider the ILCD format developed by the European Commission as an interim solution. With this approach, the GFLI database an embedded database in the main LCA software, as described in figure 4.

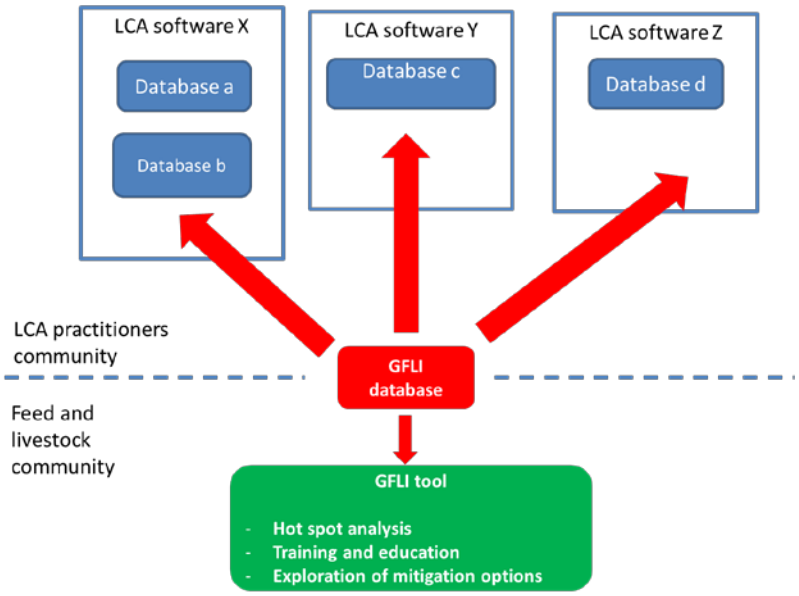
Besides facilitating uptake by practitioners, the GFLI policy is also to collaborate with existing initiatives and to establish synergies. This would reduce the costs associated with the development of the database and increase its acceptance at the same time. To illustrate this, discussions have already started between the GFLI and the French public authorities for enabling access to the French database Agribalyse through the GFLI. Considering the USA/Canada regional project, establishing a link with the LCA Digital Commons developed by the USDA would also be extremely useful.

The other aspect to consider for the dissemination of the GFLI deliverables is how to deal with the feed and livestock community. Despite the importance of environmental footprinting for the compound feed industry, very few feed companies can rely on in-house LCA expertise. The purpose of the GFLI tool is to provide access to the GFLI database for non-LCA experts. The GFLI tool is therefore targeted at the feed and livestock community and will support the following actions:

- Hot spot analysis
- Training and education
- Exploration of mitigation options

This twin-track approach aims at facilitating the use of the GFLI deliverables.

Figure 4: dissemination and use of the GFLI deliverables



5. Conclusion

The Global Feed LCA Institute is a rather new initiative which takes place in a changing landscape as far as the development of LCA databases is concerned. To deliver according to its objectives, the GFLI has set up an innovative governance mechanism which relies on regional project delivering data in a consistent and harmonised manner.

The GFLI is conceived as a long term organisation. The initial phase of the GFLI has started in a project mode, with the financial support of the feed companies and associations which have decided to become GFLI members. Relying on front runners to start an activity is a quite common mechanism. The EU Project Steering Group will deliver its data to the GFLI by the end of 2016. The USA/Canada Project Steering will deliver its data to the GFLI by the end of 2017. In order to become a sustainable organisation, the GFLI needs however to identity the relevant mechanism to maintain and update the outcomes of the initial project phase, without relying permanently on front runners. From that perspective, being able to recruit new members and engage activities in other regions is a key factor of success.

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