

# Moving beyond least cost formulation to enable a sustainable animal protein value chain

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## Take-home message

With 50-80% of total environmental impacts associated with animal protein originating from feed, there is a significant opportunity for designing animal diets with more sustainable formulations. Rapid growth of life cycle environmental data within the feed and animal protein sectors and scalable digitalization are enabling a new interconnected dimension in feed formulation focused on environmental footprint. This session will provide a foundation for the sustainability challenges as well as the clear opportunity and approach for the industry to move beyond least cost and towards least impact formulation to enable a sustainable animal protein value chain.

## Abstract

The environmental impact of livestock farming and associated value chain is a global challenge that requires immediate and scientifically proven solutions. Public institutions at national and global level, investors, retailers and consumers demand a reduction in the environmental impact of animal protein. The first step towards this change is not only to recognize the environmental impact, but to quantify it accurately. Today, we know that feed is the dominant factor in the overall environmental impact of animal production. By innovating for more sustainable feed formulations, we can positively influence, directly or indirectly, up to 80% of the total environmental footprint.

Currently, the key requirements for optimizing the feed formulation are based on an adequate nutritional content and the minimum possible cost within given constraints. The importance of these factors will remain in the future, but a third dimension - environmental impact - is now critical for continuing to sustain a viable animal protein sector. Digitalization and increasing availability of data for the feed and animal protein value chains are bringing new capabilities that enable the data transparency and solution connectivity necessary for assessing environmental impact. Using Life Cycle Analysis (LCA), a proven scientific method that evaluates the environmental aspects and potential impacts associated with a product, a clear understanding of environmental impacts and associated opportunity levers is possible. Furthermore, initiatives including the UN FAO Livestock Environmental Assessment and Performance (LEAP) guidelines and the Global Food LCA Institute (GFLI) database have enabled a consistent methodology and data approach to be implemented for the global feed and animal protein industry. Such consistent LCA approaches consider all relevant factors including assessment of the feed ingredients, transportation and utilities, housing and manure management systems and animal farm performance parameters.

Very recent innovation in this space also now allows feed and livestock producers to evaluate and improve their environmental impact on feed, at farm and ultimately the food directly in the feed formulation phase. Integrated connectivity of feed and animal protein environmental modeling with feed formulation systems is already possible. This enables efficient and immediate transparency on the

environmental impact of a given feeding system considering a multi-attribute analysis including for carbon footprint, water consumption, land use, eutrophication from excess nitrogen and phosphorous and other impact categories. With input parameters from the feed formulation and associated animal performance, results can be derived on a per ton of feed level as well as a per ton of animal protein harvested.

Integrating sustainability insights and optimization capabilities into everyday feed formulation enables highly efficient scenario analysis where the nutritionist, formulator or farm advisor can take immediate action to reduce environmental impact of his/her formulations. This approach allows for direct operationalization of organizational and value chain sustainability strategies to tactically deliver on tangible environmental impact reductions related to the feed formulation and critically to the final animal protein. Ultimately, integration of sustainability insights as a third pillar within feed formulation delivers on the opportunity for the industry to move beyond least cost and towards least impact formulation.



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**The science of sustainable feed that succeeds**

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