DairyPrint model: Paving pathways for dairy farmers towards higher sustainability

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INTRODUCTION

- Quantifying greenhouse gas (GHG) emissions (i.e., CH_4, N_2O, and CO_2) from all significant sources in dairy farms is difficult and prohibitively expensive.
- The same applies to nutrient balance and management.
- Therefore, farmers must rely on mathematical models to achieve this.
- However, available models are cumbersome and overwhelming to use.

OBJECTIVE

To develop a simple, minimalistic, user-friendly, and scientifically sound whole-farm decision support model to assess environmental tradeoffs of dairy farming.

MATERIALS AND METHODS

- The DairyPrint model is composed of herd, barn, manure, crops and purchased feeds, and economic modules (Figure 1).
- Equations to predict animal outcomes (DMI, Milk Yield, Manure Excretion, etc.) and GHG emissions (herd and other modules) from well known references as NRC (2001), IFSM (2015), IPCC (2006), and others.

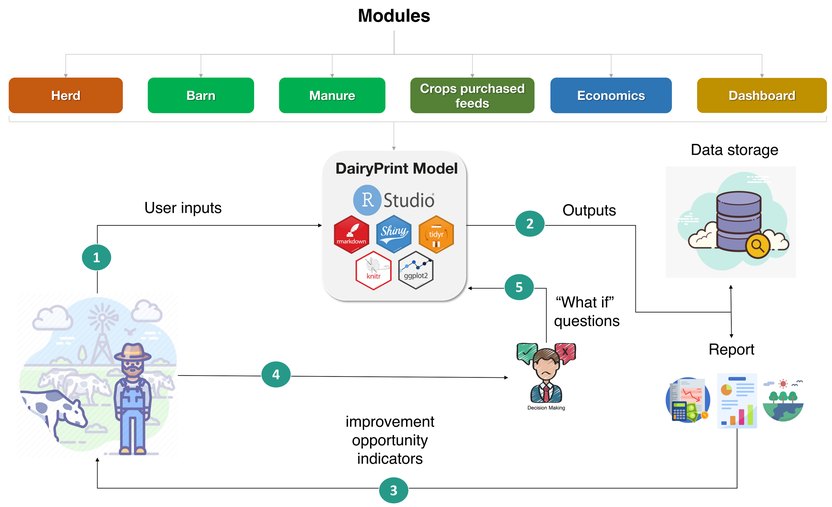


Figure 1. Diagram showing the overall structure of the DairyPrint model.

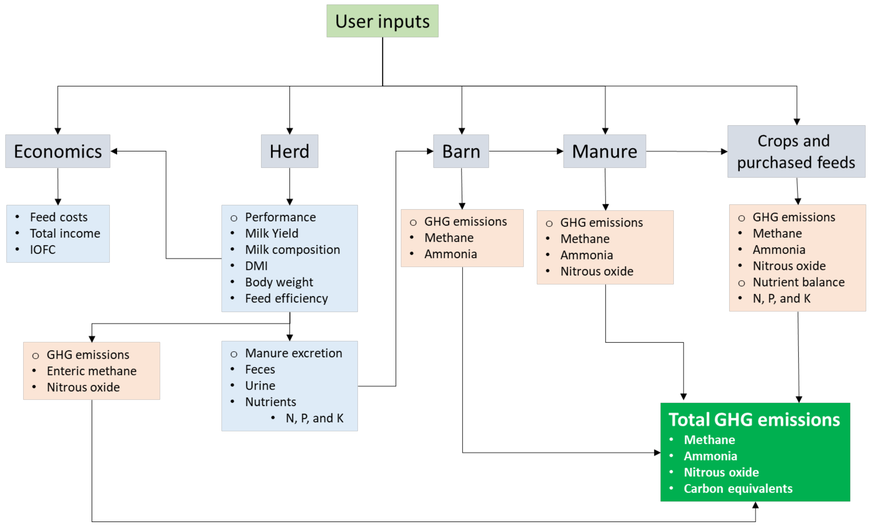
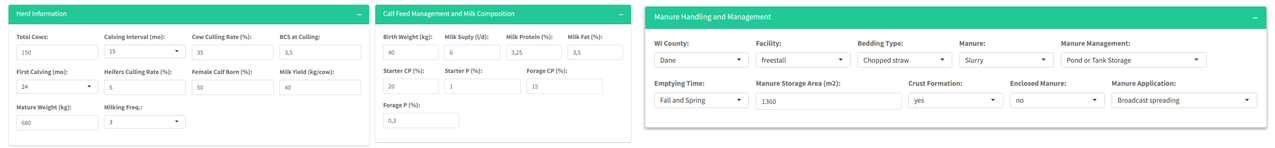
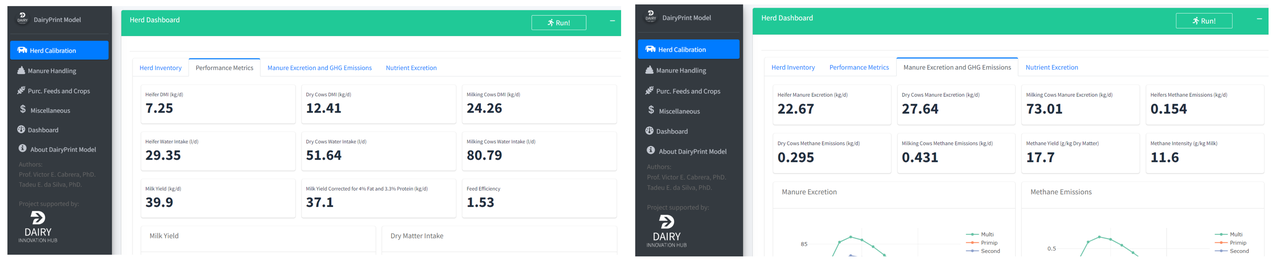


Figure 2. The DairyPrint model: diagram of the modules and their connections (flow of outputs).

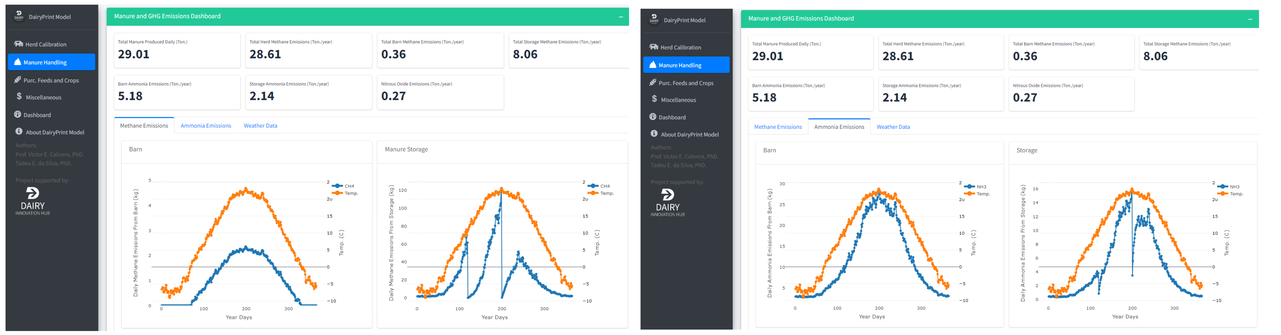
RESULTS – Inputs: Herd and Manure



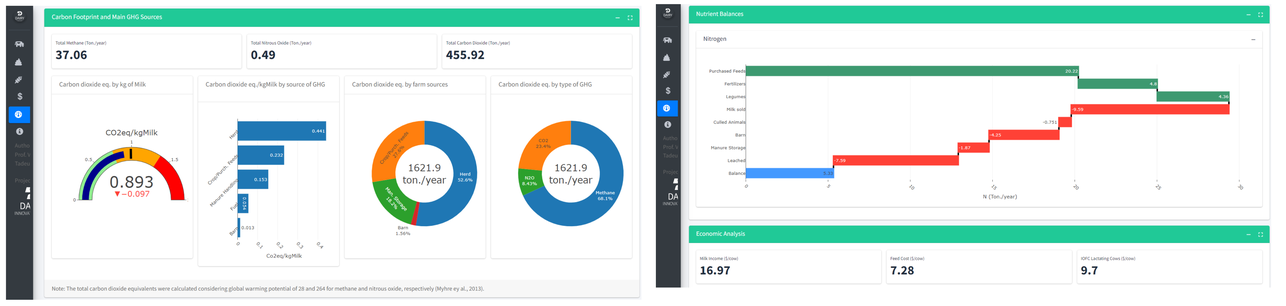
RESULTS – Outputs: Herd



RESULTS – Outputs: Manure



RESULTS – Outputs: Dashboard: carbon footprint, nutrient balances, and economics



CONCLUSIONS

- The DairyPrint model is capable of helping farmers move toward higher sustainability, providing a user-friendly and intuitive graphical user interface allowing the user to respond to "what-if" questions.

ACKNOWLEDGMENTS

This work was funded by the Wisconsin Dairy Innovation Hub.