ADSA Meeting, Phoenix, 15-19 July 2012

IMPACT OF ANIMAL DENSITY ON PREDICTED GREENHOUSE GAS EMISSION ON SELECTED CONVENTIONAL, ORGANIC AND GRAZING DAIRY FARMS IN WISCONSIN.

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Greenhouse gas emission

Animal Production: 18% of GHGE from human activity[1]

Increasing profitability by increasing herd size

Impact of increasing animal density on predicted GHGE ?

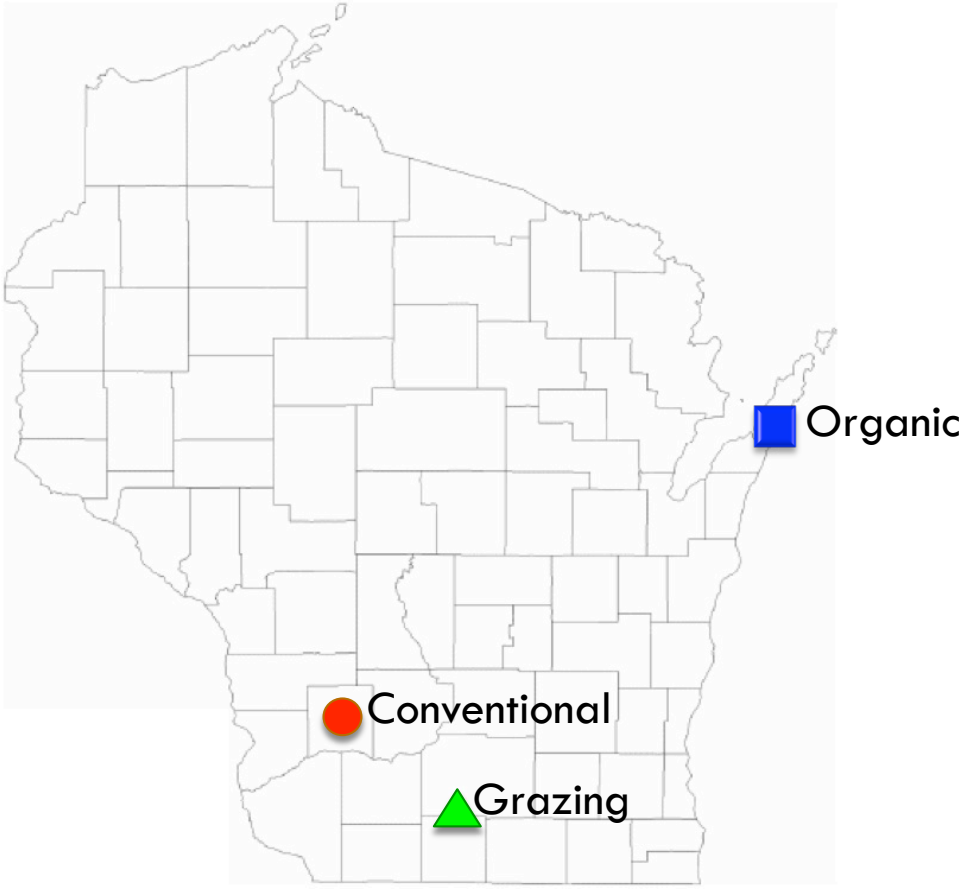
[1]FAO, 2010

Objectives

Assessing the impact of increasing animal density on predicted greenhouse gas emission on 1 grazing, 1 organic and 1 conventional selected farms.

Material and Methods

- 3 selected Wisconsin dairy farms were surveyed:



Farms characteristics

	Conventional	Organic	Grazing
Number of cows	75	80	80
Number of hectares for forages	134.0	132.3	134.8
Alfalfa (ha)	57.1	69.6	0
Grass (ha)	0	62.7	134.8
Corn (ha)	76.9	0	0
Stocking rate (cow/ha)	0.56	0.60	0.59
Milk production (kg/cow per year)	11,669	4,754	4,990

Materials and Methods

- Data collection:

1. Surveys to collect on farm data:
   - Herd management (feeding, reproduction…)
   - Land management (cropping system)
   - Manure management

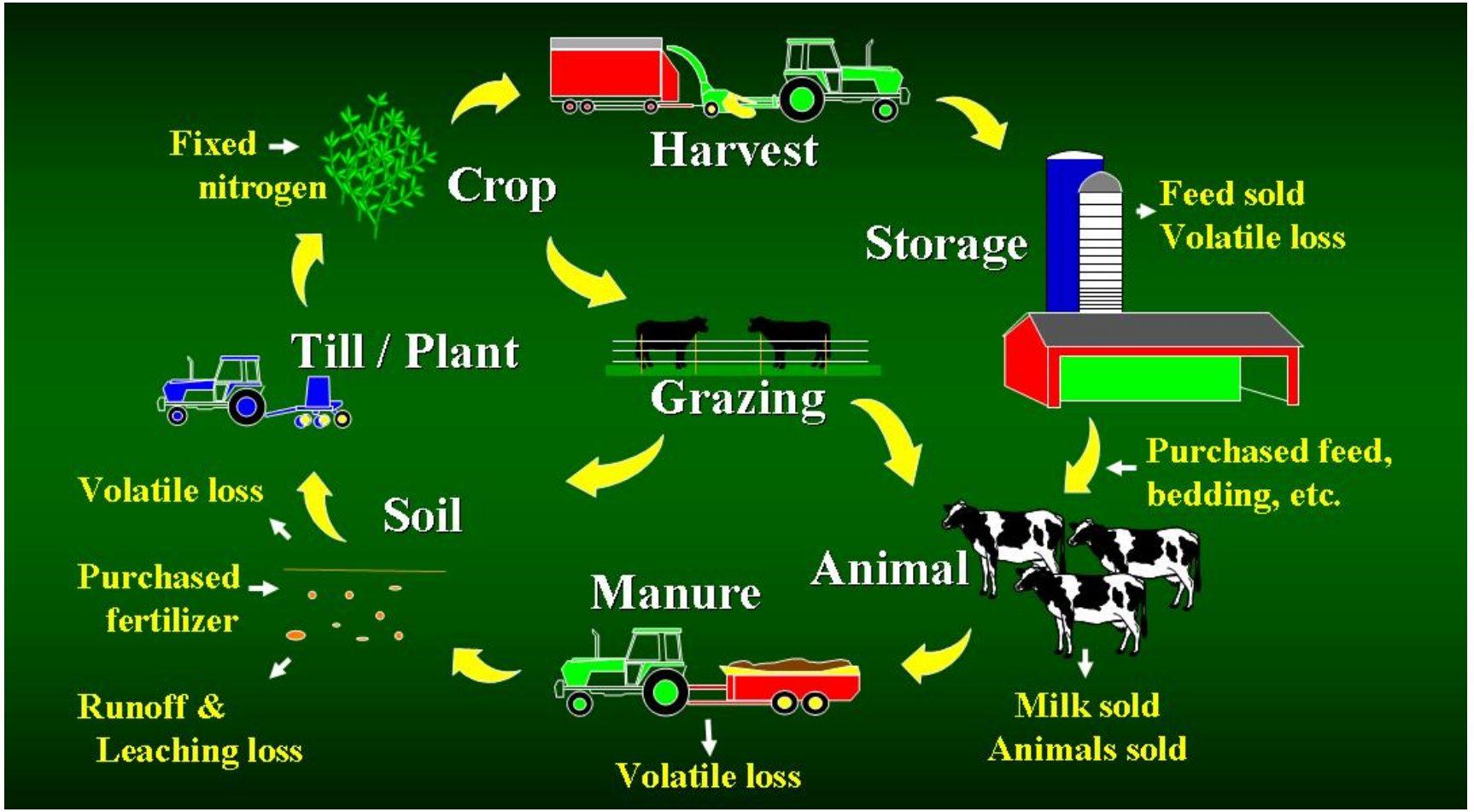
2. Weather data for 25 years.

3. Soil data

- The Integrated Farm System Model (IFSM)[1] was used to predict greenhouse gas emissions.

[1]Rotz *et al,* 2011

The IFSM model



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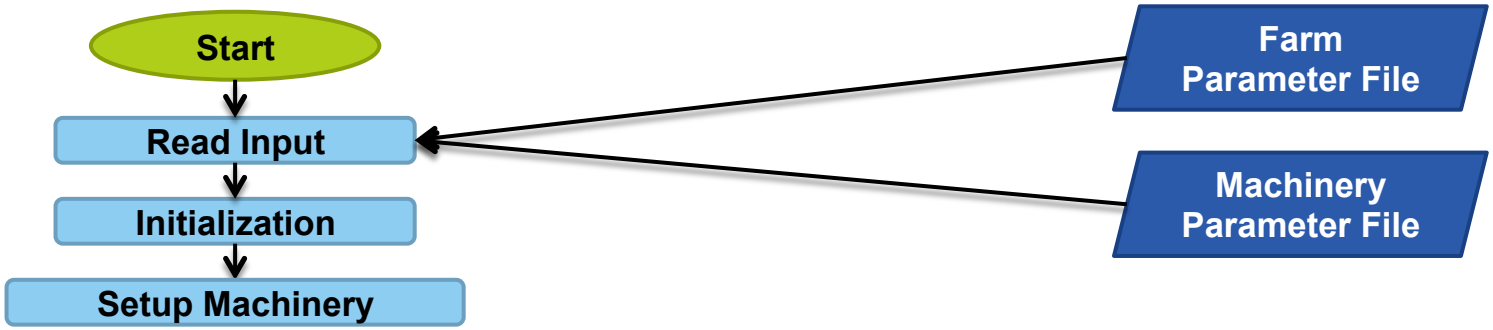

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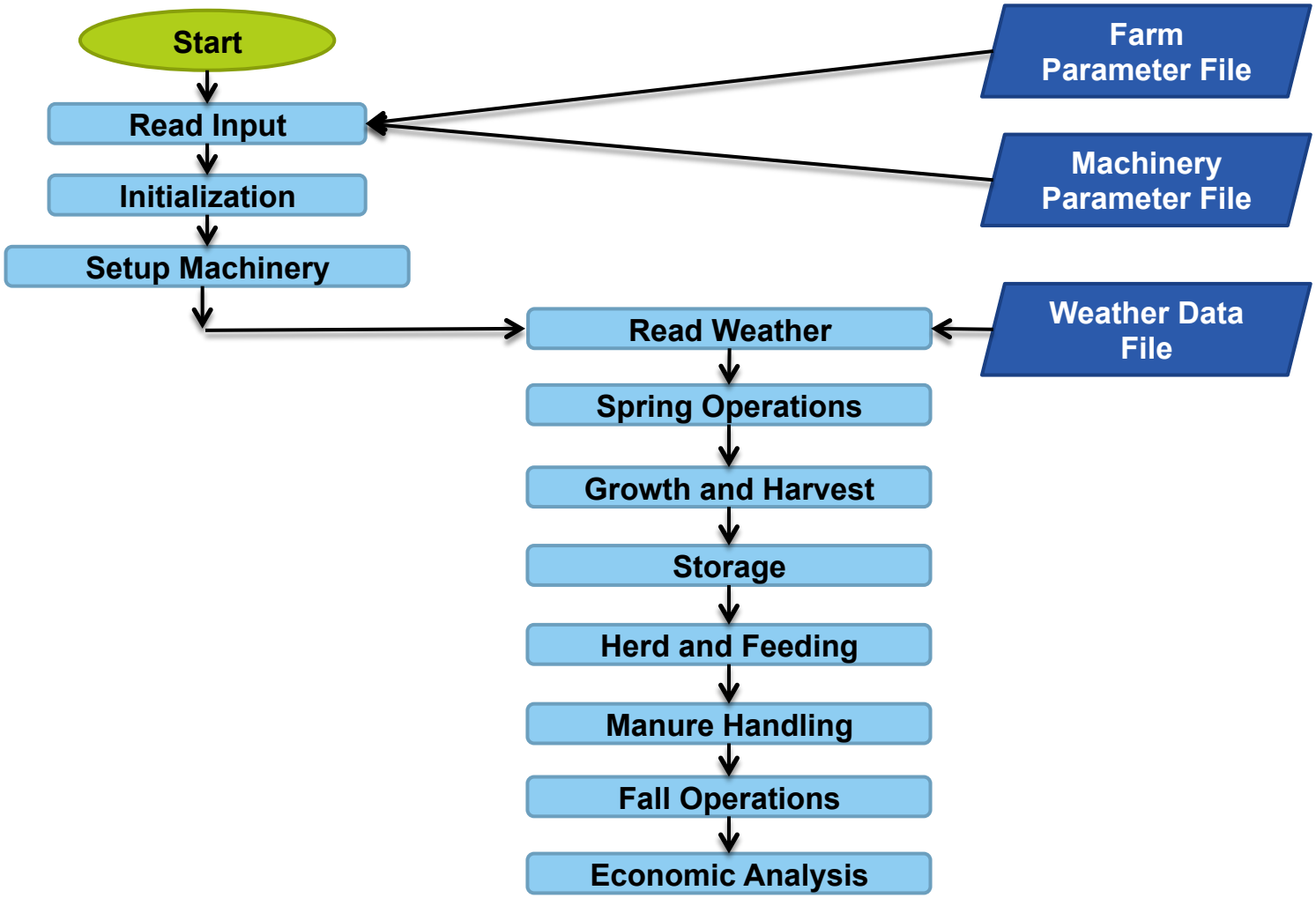

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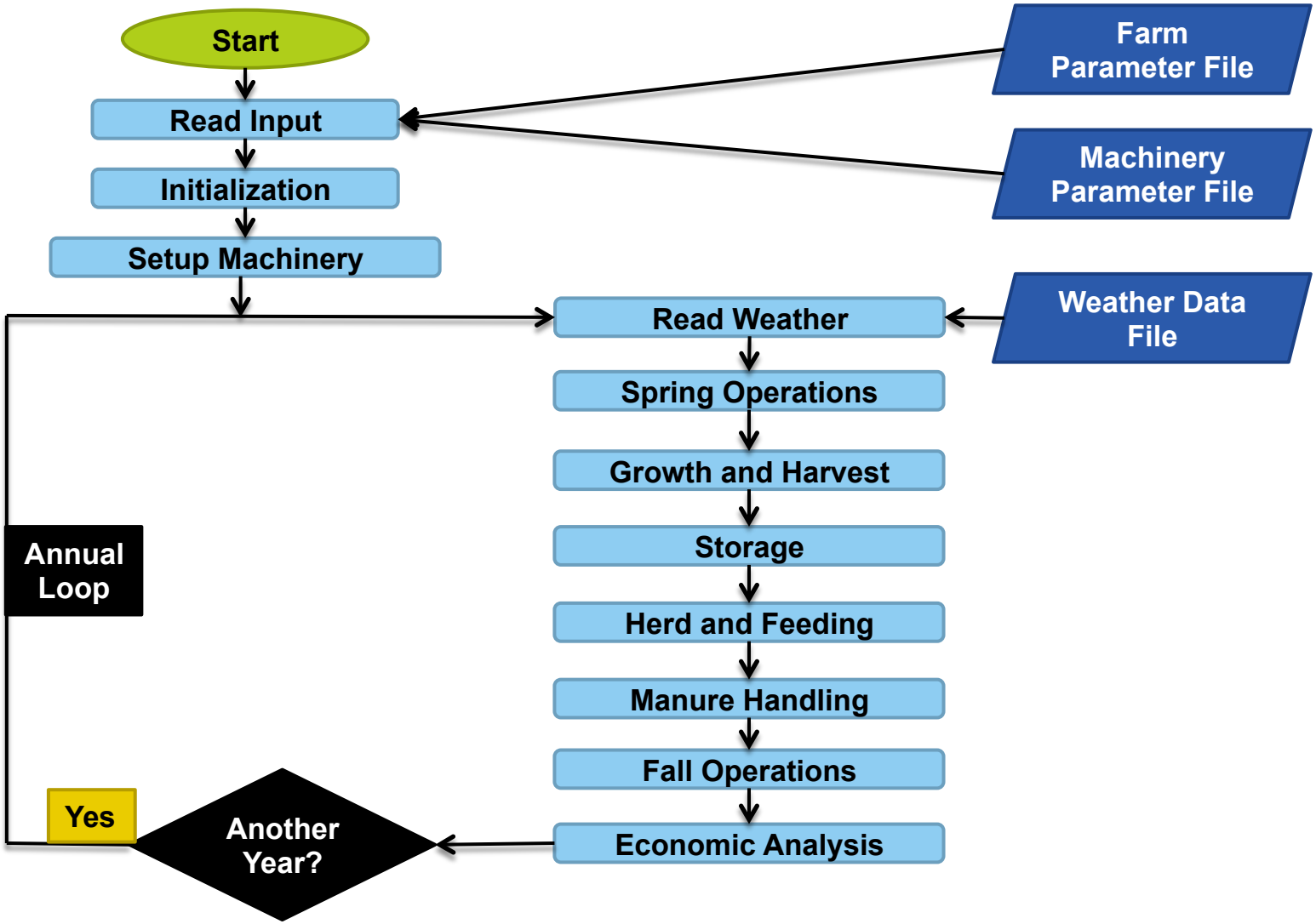

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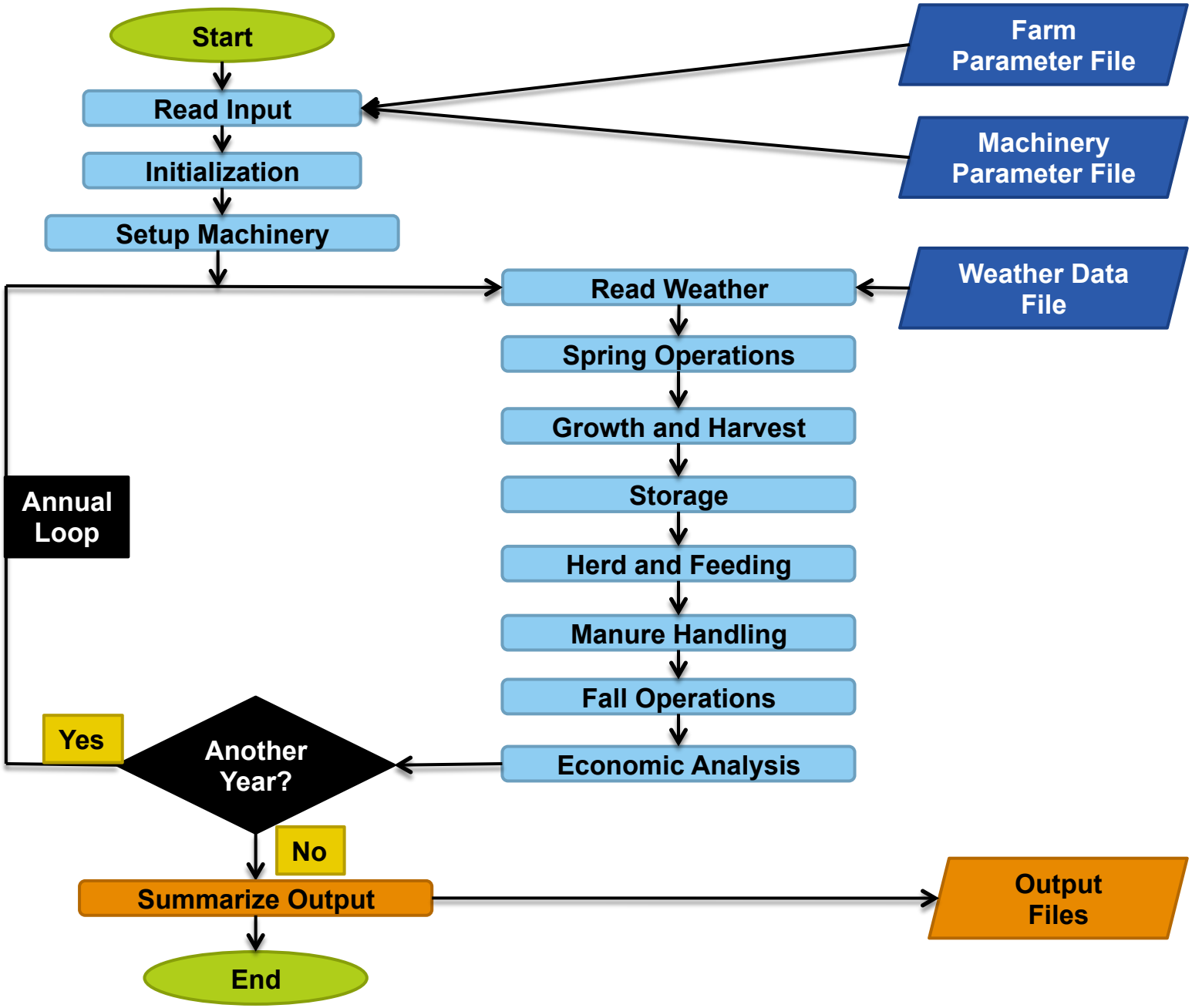


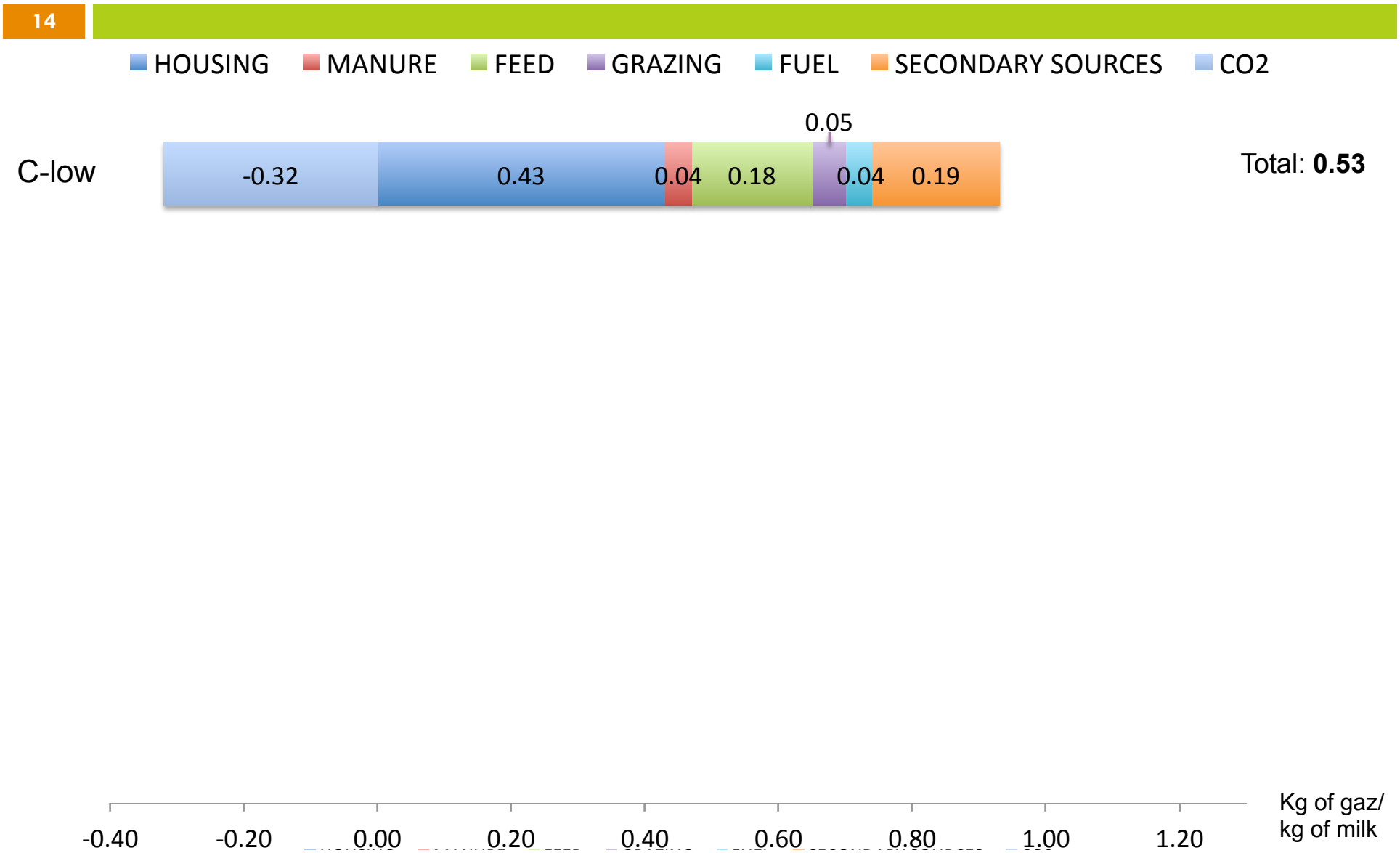
Adaptated from Rotz *et al,* 2011

RESULTS

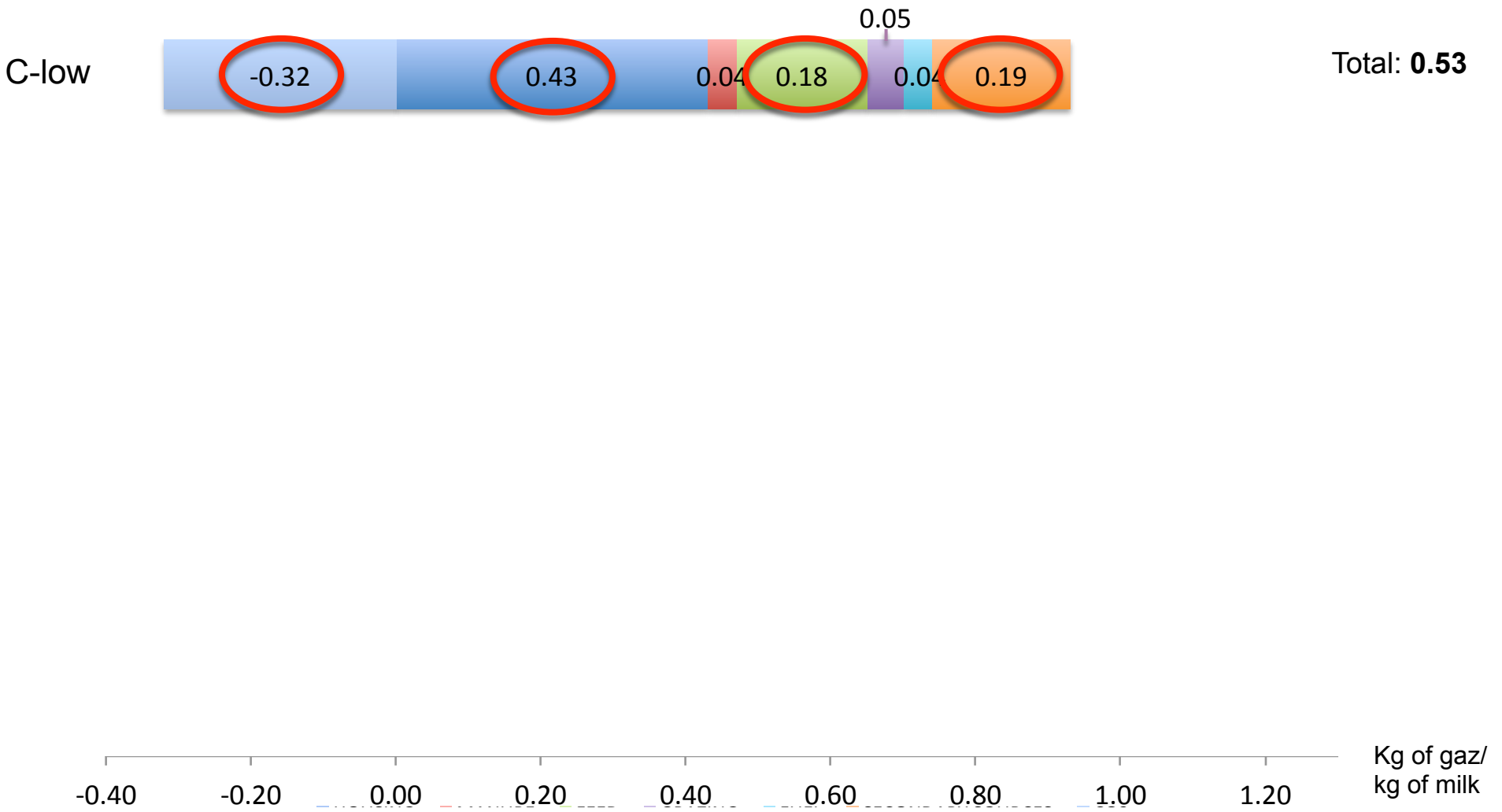
Farms characteristics

	Conventional		Organic		Grazing	
	Low Stocking Rate	High Stocking Rate	Low Stocking Rate	High Stocking Rate	Low Stocking Rate	High Stocking Rate
Number of cows	75	**150**	80	**160**	80	**160**
Number of hectares for forages	134.0		132.3		135.2	
Alfalfa (ha)	57.1		69.6		135.2	
Grass (ha)	0		62.7		0	
Corn (ha)	76.9		0		0	
Stocking rate (cow/ha)	0.56	**1.12**	0.60	**1.21**	0.59	**1.18**
Milk production (kg/cow/year)	11,669	**11,587**	4,754	**4,754**	4,990	**4,990**

Predicted greenhouse gas emission



Predicted greenhouse gas emission



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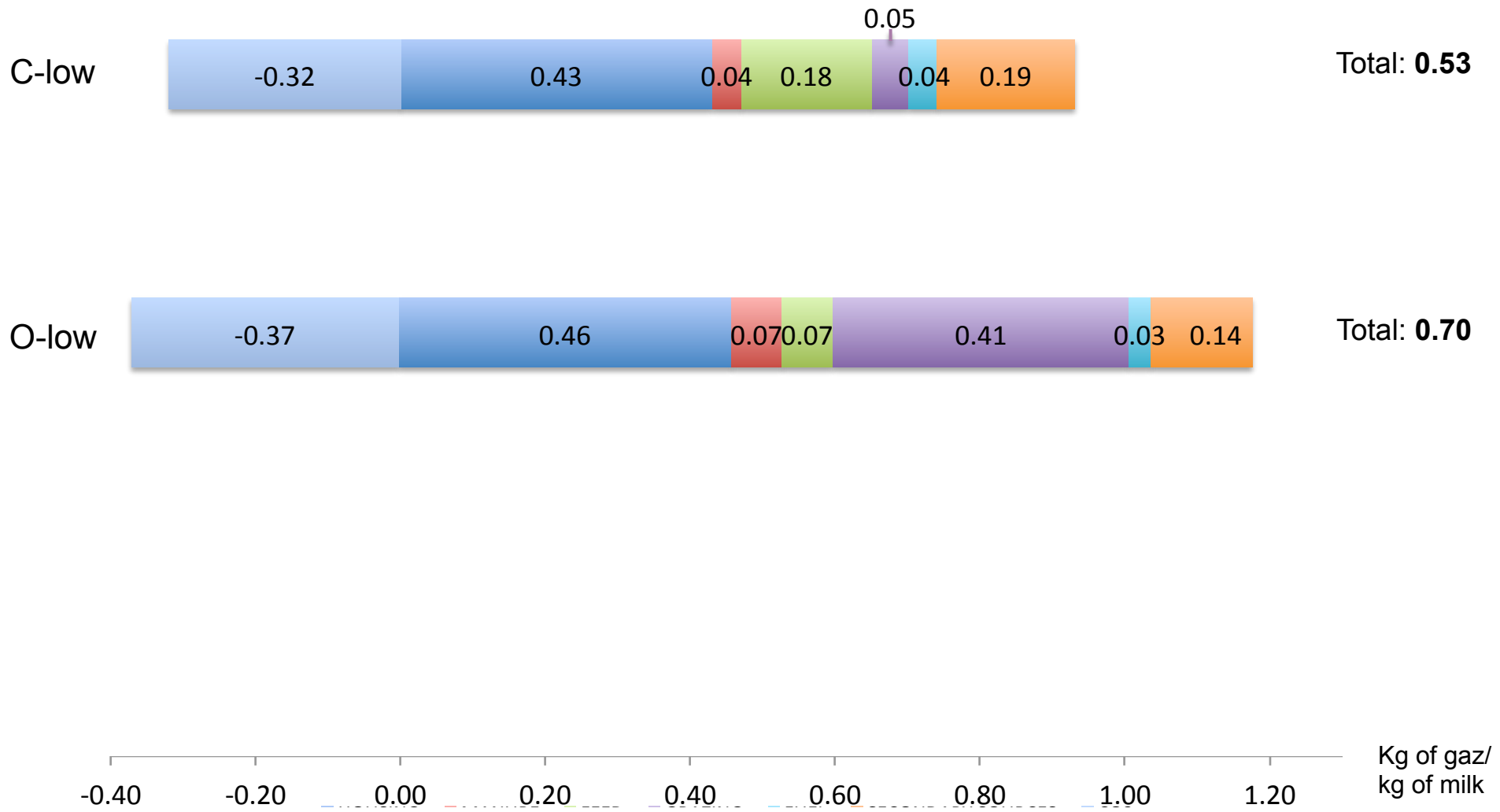
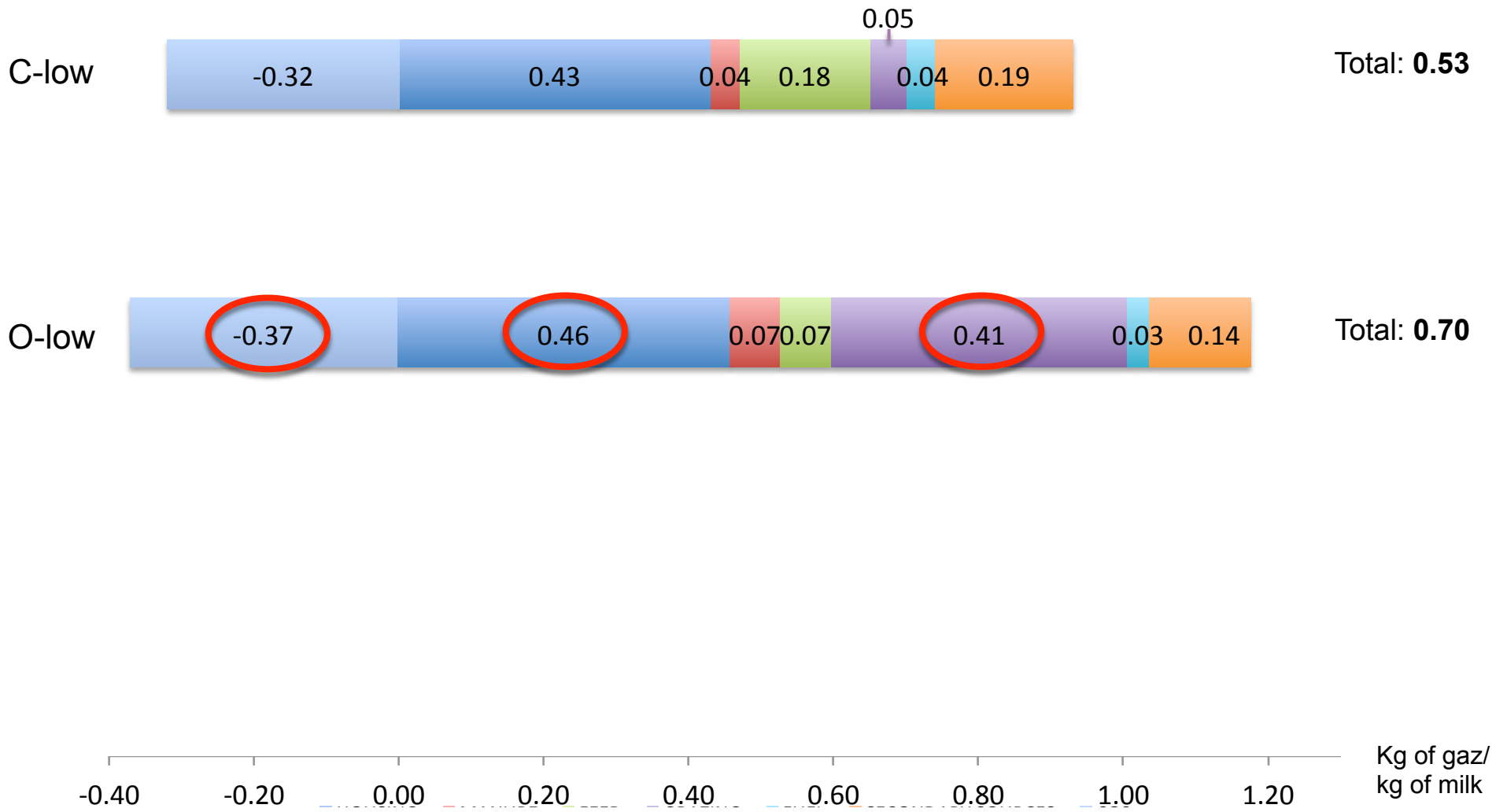
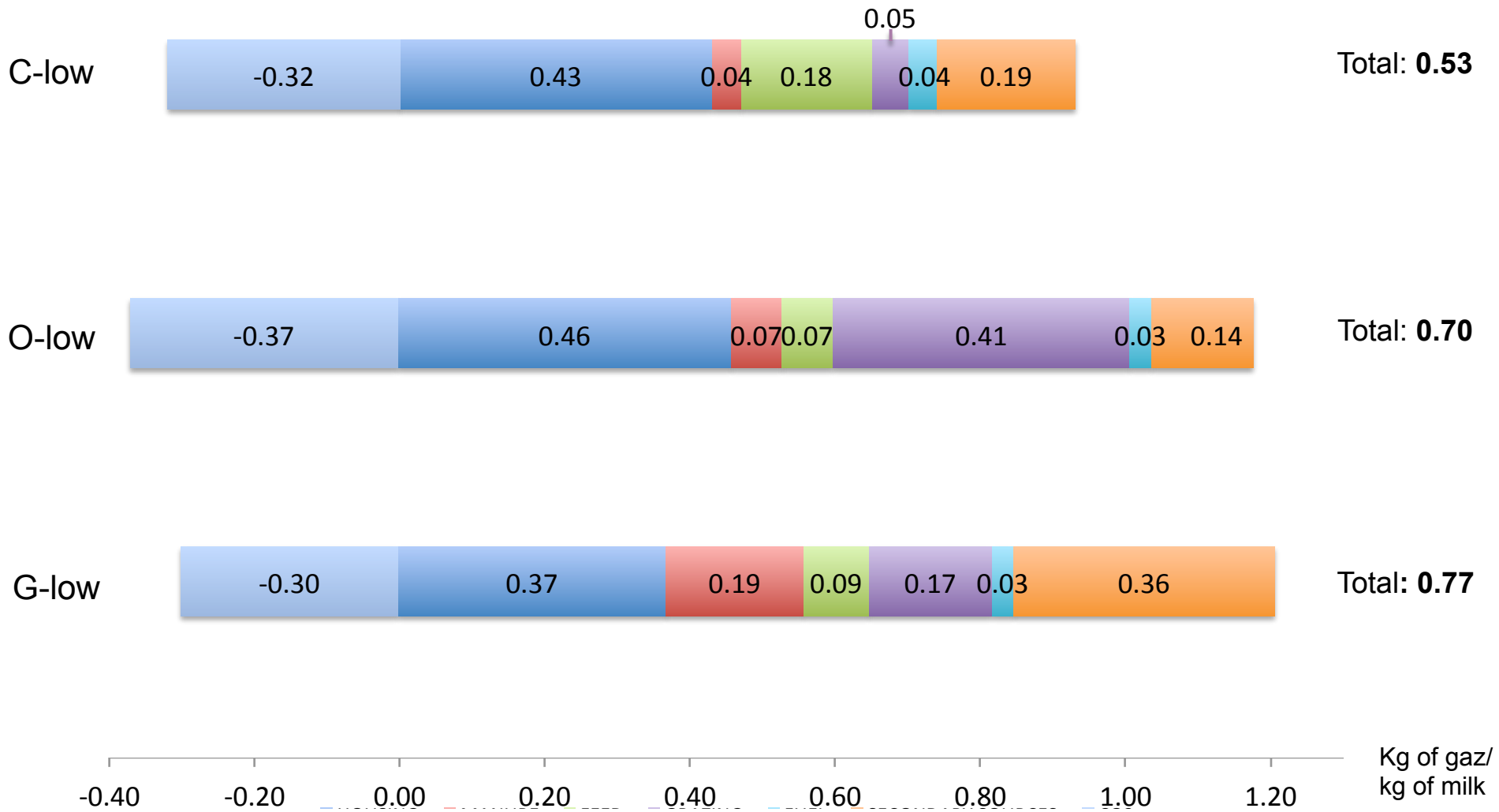


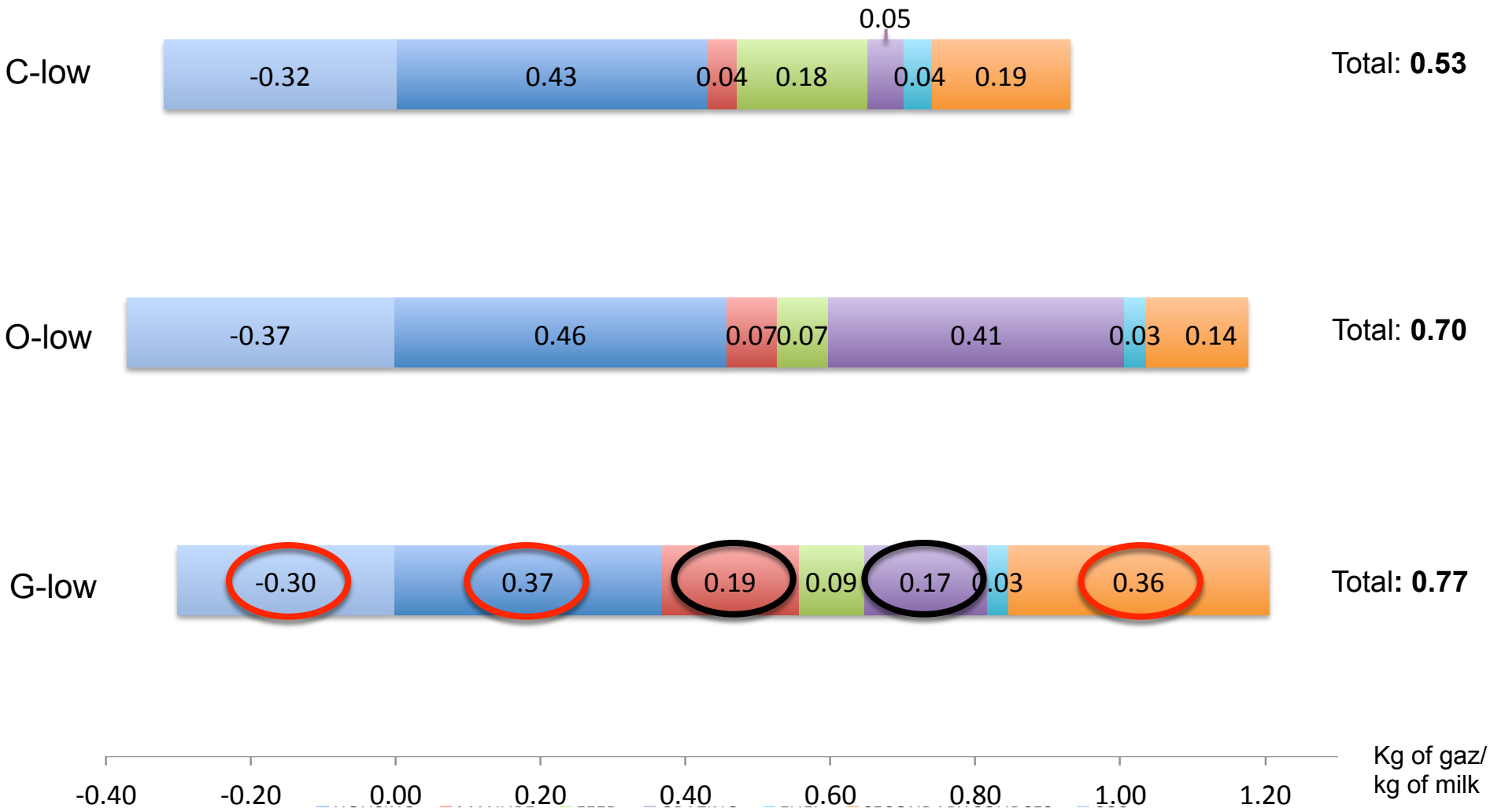
Predicted greenhouse gas emission



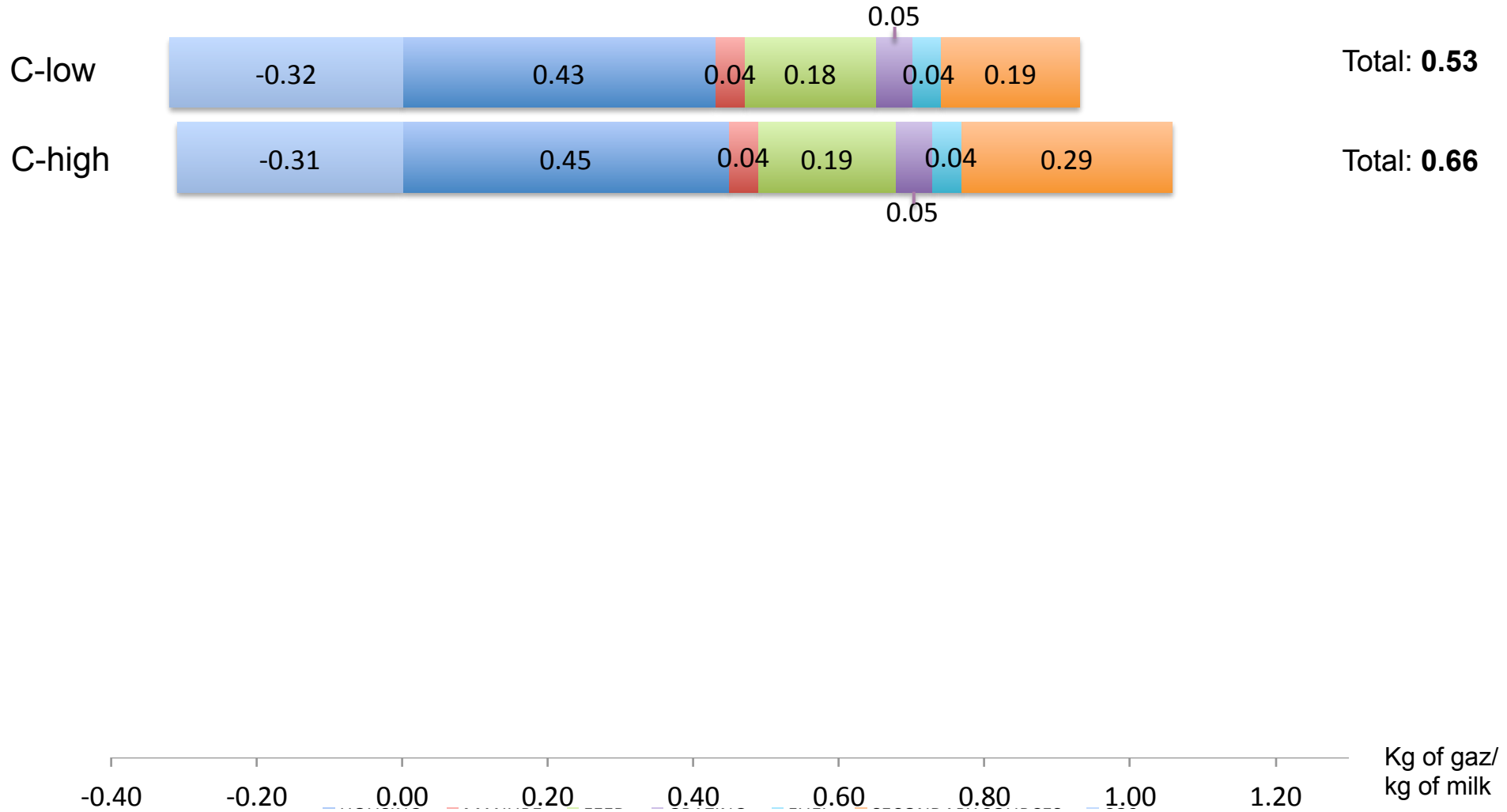
Predicted greenhouse gas emission



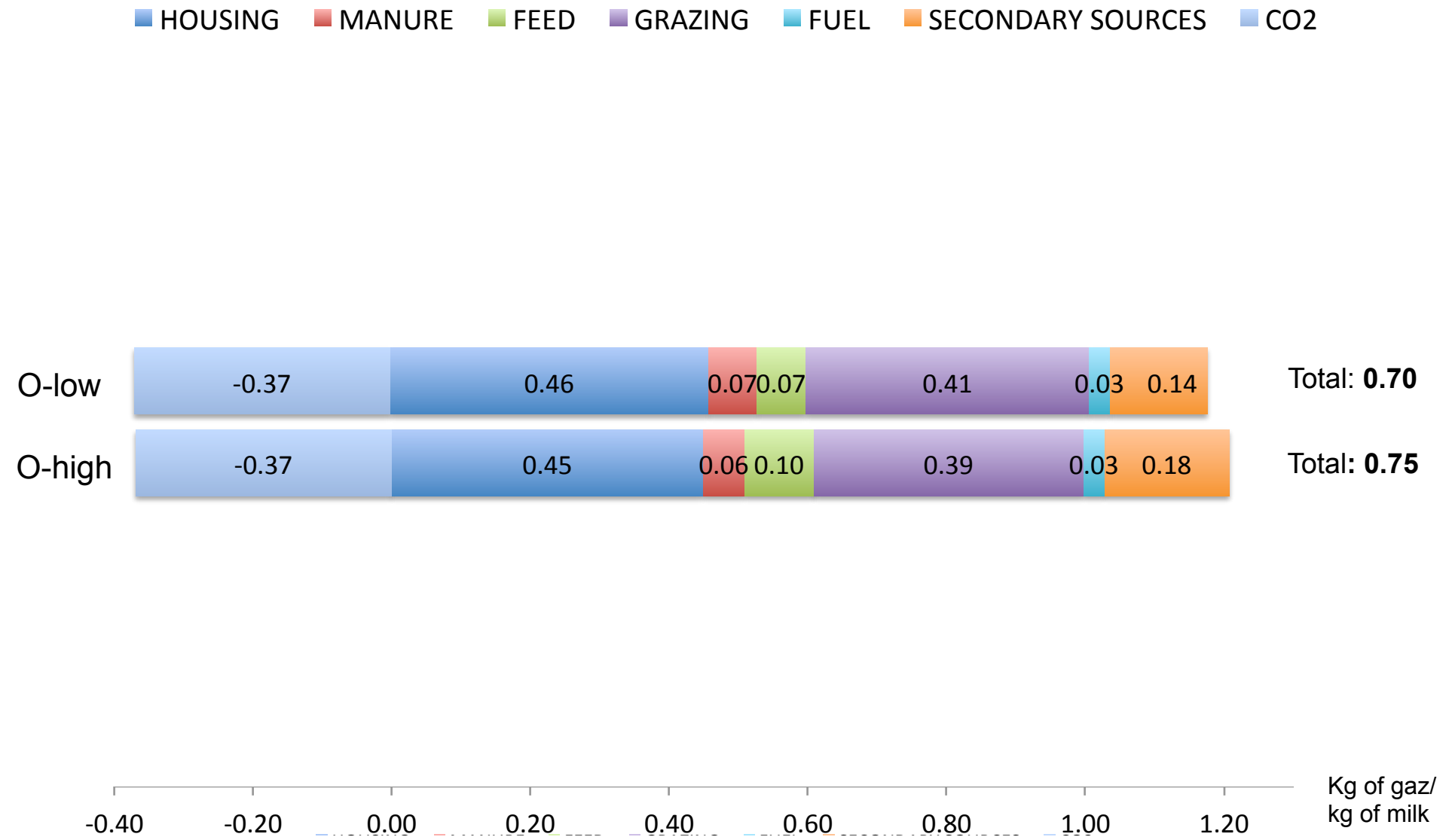
Predicted greenhouse gas emission



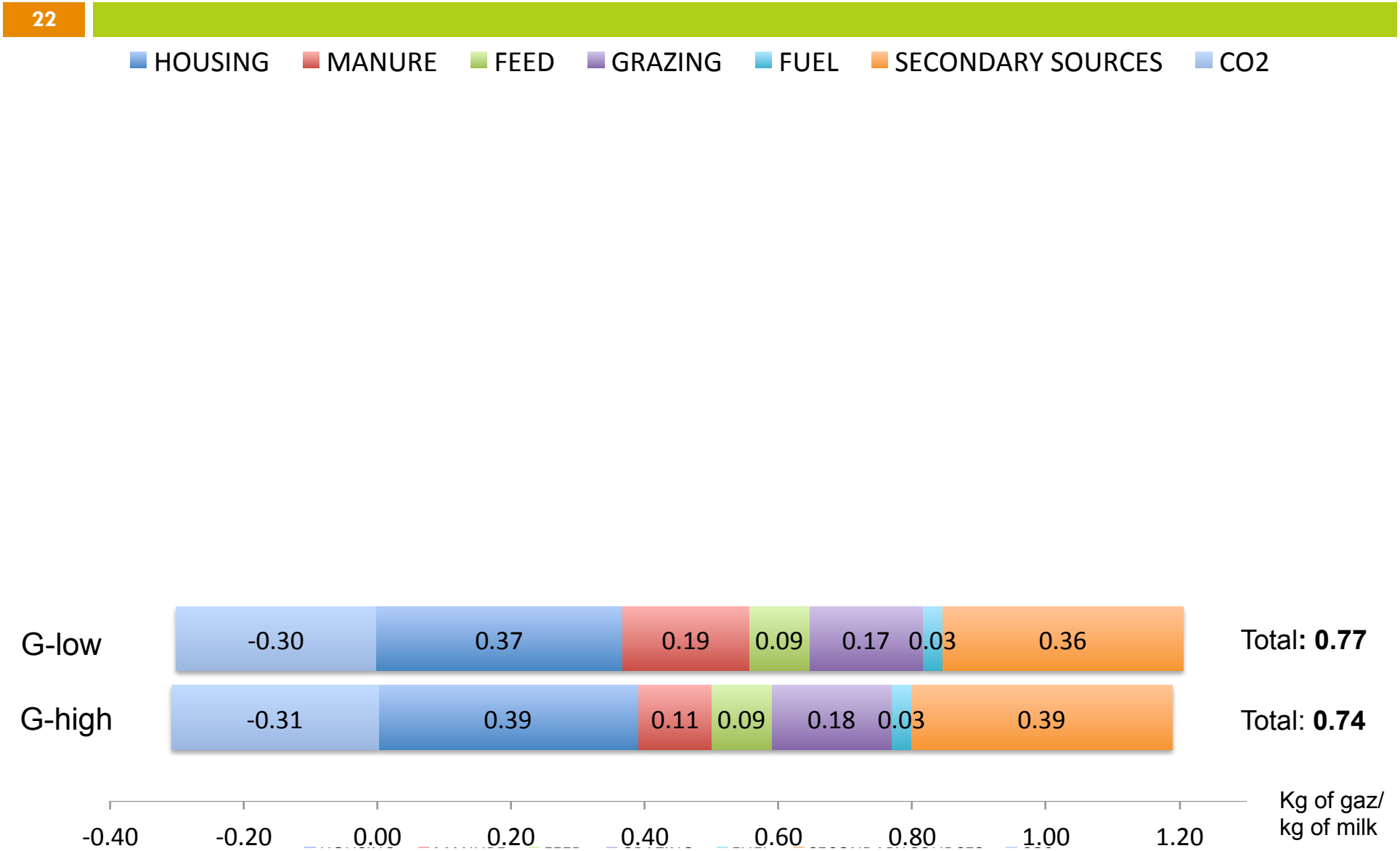
Predicted greenhouse gas emission



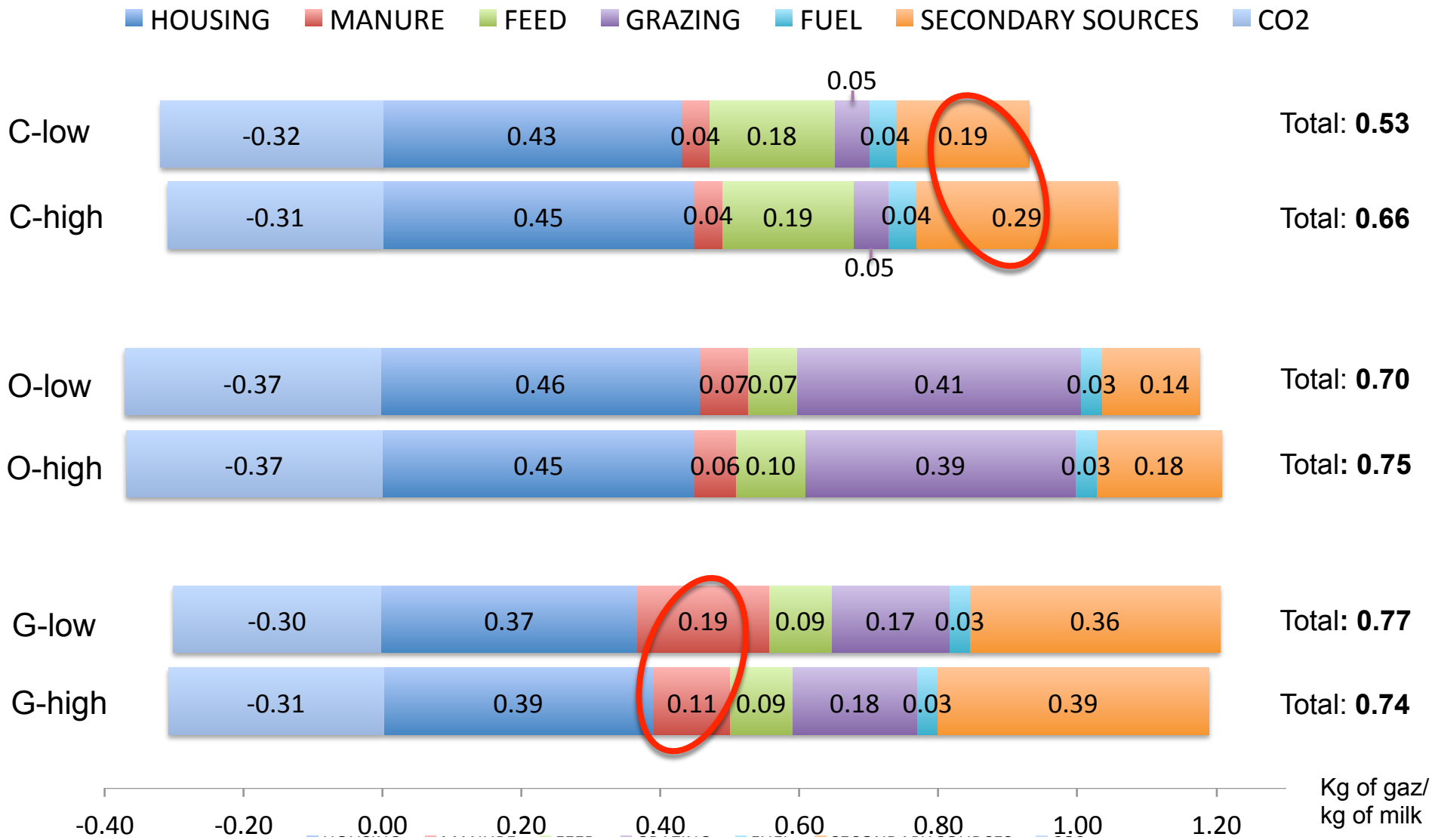
Predicted greenhouse gas emission



Predicted greenhouse gas emission



PREDICTED GREENHOUSE GAS EMISSION



CONCLUSION

Conclusion

- The scope of this study is limited to those 3 farms.
- The effect of animal density on predicted GHGE depends on farm management.
- Combining real farm data with model-based prediction is useful to study the effect of farm management on predicted GHGE and to help farmers make decision on the farm.

Acknowledgement

This Project is Supported by Agriculture and Food Research Initiative Competitive

Grant No. **2010-51300-20534** from the USDA National Institute of Food and Agriculture, Organic Agriculture Research and Extension Initiative (OREI)

The End

Literature

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