GRSB On-Farm GHG Tools Comparison

January to June 2024

Climate Working Group

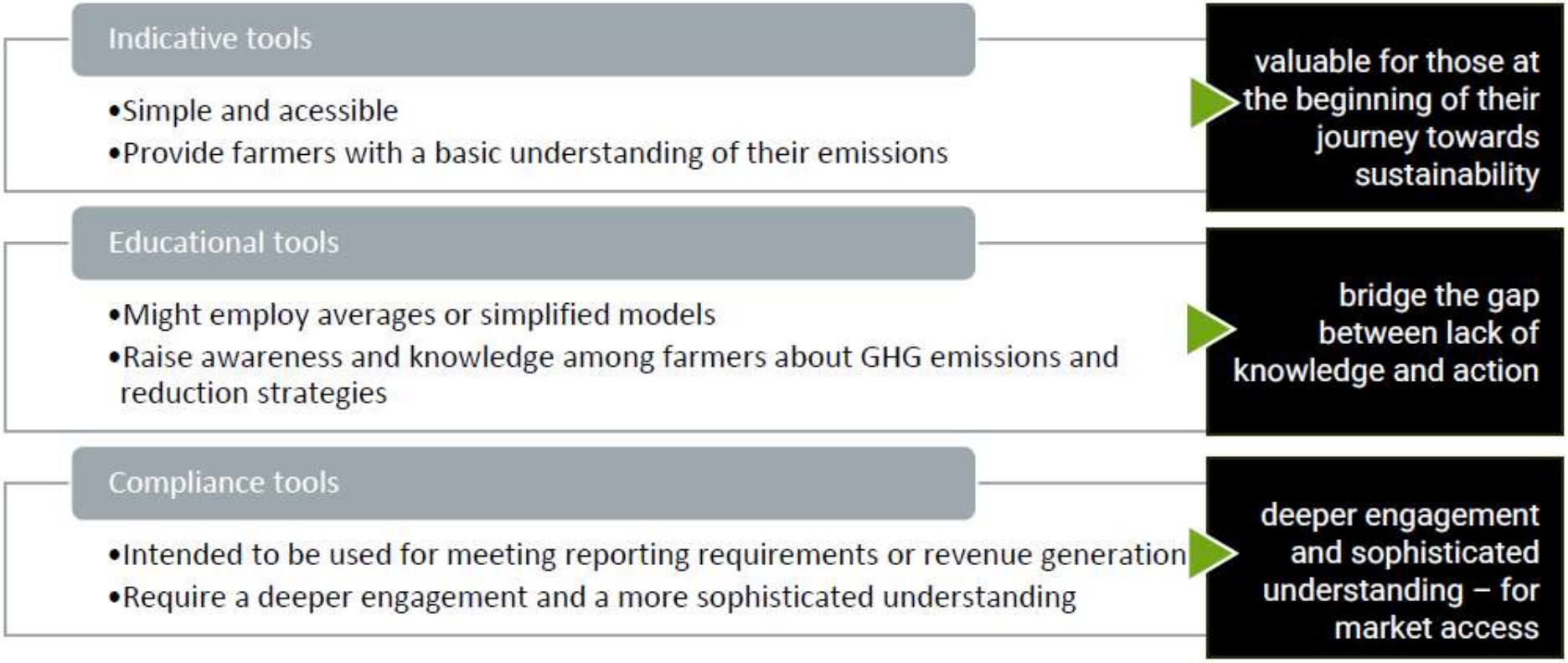
Purpose

- The GRSB is excited to see how different **on-farm carbon measurement tools/models** line up with each other and the GRSB Climate Footprint Guideline.
- In March 2024, a survey was conducted with 17 responses from tool administrators that apply to the beef sector.
- The results of this comparison are being shared with the GRSB membership.
- The goal is to better understand the different tools available in countries around the world.
- We recognize that there are many different tools available for different purposes and wish to facilitate and guide GRSB members to the tool that best suites their purposes and objectives.

17 Participants

- GLEAM
- Sustell (DSM-Firmenich)
- Australia GAF Tool
- Ruminati
- Ceres Tag
- MLA Carbon Calc
- BLNZ GHG Calc
- COOL Farm Tool
- TELUS Sustianability
- Alltech E-CO_2 Beef EA™
- Agrecalc
- Beef GEM
- Sandy
- Terratio
- Elanco
- HOLOS
- ReGrow

Types of Tools



Source: CAPI Report "From Education to Action: A Review of Greenhouse Gas Tools in Pursuit of Net-Zero Agriculture"

Data Sources

Several sources of data that inform GHG calculations:

- ✓ IPCC Tier I and Tier II calculations
- ✓ Life Cycle Analysis (various sources)
  - ✓ GHG Protocol
  - ✓ GRSB Climate Footprint Guideline
- ✓ Peer-reviewed empirical research
- ✓ Federally derived emissions estimates
  - ✓ Australia's National Greenhouse Gas Accounts Factors
  - ✓ Canada's National Inventory Report
  - ✓ New Zealand National Inventory Report
  - ✓ USDA GHG inventory methods
- ✓ Combinations of the above methodologies

General overview

- **Purpose**: 11 out of 17 tools are for GHG emissions and soil carbon accounting; 5 are for GHG emissions accounting and 1 includes deforest free supply chains
- **Audience**: 16 were for producers, 5 for researchers, 3 policy makers, 6 farm consultants, 2 AgriBusiness, 8 Value Chain players, 1 Certification bodies and 1 financial institution

- Only 2 were **open source**, the majority (15) were not
- Almost all covered the **3 main GHGs** (CH_4, CO_2, N_2O)
- Most reports **GWP values** are using AR5 (6) or AR6 (7)
- Most (11) were developed in **collaboration**
- 13 have been **third-party verified**
- Most (10) cover **one-calendar year**, followed by 7 covering **one-production period**

Data Requirements

- **Data requirements** were mixed: low (4), medium (6), low to medium (2), high (4)
- **On-farm measurements** were required by 10, and only for soil for 2
- **Data verification** at the farm was only required for 2, and depending on the objective for 4, otherwise No (11)
- **Crop yield data** required for 11
- Tool **degree of uncertainty** depended on data quality (3), depending on emission source (2), +/-20% (2), most did not provided (7)
- **Acceptable uncertainty** was not provided (6), or below 20% (2)
- **Historical baseline data** required was mostly one-year (6), followed by a minimum of 3 years (2)
- **Data rights and ownership** is primarily held by the customer (10) or tool user (2)

Scoping

- **System boundaries** were primarily Cradle to farm gate (10), cradle to farm gate or first processing (4)
  - Fertilizer was in scope for 14
  - Seed production was in scope for 5
  - Production of equipment was in scope for 4
- **Functional unit** is primarily kg CO_2/kg LW (14) or kg CO_2/kg CW (6)
- **Data granularity** required was mostly at the animal level (10), whole farm level (9), field level (7), followed by commodity specific (5) and supply chain (4). There was overlap for tools
- **Carbon removals** and soil C sequestration were accounted for by 11
- Most (15) were **location specific**, with the others unclear
- **Biogeochemical elements** were covered in 13
- Most models were **process (7) or deterministic (7)**
- Most (12) aligned with **national inventory reporting** guidelines
- Country specific coefficients were Tier 1, 2, 3 (5), Tier 1, 2 (3), Tier 2, 3 (3)

Allocation

- Transport was included by 10
- Allocation of crop co-products at farm was included by 8
- Feed mill operations were covered by 9
- Live animal outputs were covered by 10
- Manure at farm were covered by 12
- Slaughter was covered by 4

Other

- The methodology is **publicly available** for 12
- The methodology is aligned with the **GHG protocol** requirements for 13
- Tool upgrades/changes are planned when the **Land Sector Removal Guidelines** are finalized by 12
- A **user fee** is required by 7, there is no fee for 6, and a fee after 5 footprints by 1

Excel Summary

- Intro tab = Overview
- Summary tab
- Original tab = Includes all data submitted
- GRSB Carbon Footprint Guideline

	GENERAL OVERVEIW																	
	Purpose				Target audience								Open source					
	GHG emissions accounting	GHG emissions accounting (also soil carbon)	Creating Measured data related to enteric emissions, genetics, deforest free supply chains and sustainability	Producers	Researcher	Policy makers	Farm consultants	Agribusiness	Value chain players	Certification bodies	Financial institutions	Yes	No	Access to the tag user	CH_4	CO_2	N_2
GRSB Carbon Footprint Guideline	✓				✓				✓			✓			✓	✓	✓
GLEAM	✓			✓	✓	✓							✓		✓	✓	✓
Sustell (DSM-Firmenich)	✓			✓			✓		✓				✓		✓	✓	✓
Australia GAF Tool		✓		✓	✓		✓				✓	✓			✓	✓	✓
Ruminati		✓		✓					✓				✓		✓	✓	✓
Ceres Tag			✓	✓					✓					✓	✓		
MLA Carbon Calc		✓		✓									✓		✓	✓	✓
BLNZ GHG Calc		✓		✓									✓		✓	✓	✓
COOL Farm Tool		✓		✓	✓				✓				✓		✓	✓	✓
TELUS Sustianability		✓		✓					✓				✓		✓	✓	✓
Alltech E-CO_2 Beef EA™	✓			✓			✓		✓				✓		✓	✓	✓
Agrecalc		✓		✓		✓	✓		✓				✓		✓	✓	✓
Beef GEM	✓			✓			✓						✓		✓	✓	✓
Sandy		✓		✓				✓	✓				✓		✓	✓	✓
Terratio		✓		✓						✓			✓		✓	✓	✓
Elanco	✓			✓									✓		✓	✓	✓
HOLOS		✓		✓	✓	✓						✓			✓	✓	✓
ReGrow		✓			✓		✓	✓					✓		✓	✓	✓
17	5	11	1	16	5	3	6	2	8	1	1	2	14	1	17	16	

Feedback received on the GRSB Climate Footprint

- Cradle to Grace scope means that sector specific tools cannot be third party validated against it
- The use of “shall” and “may”, meant that flexibility in the guideline was not allowed during third party validation

Current Limitations and Barriers

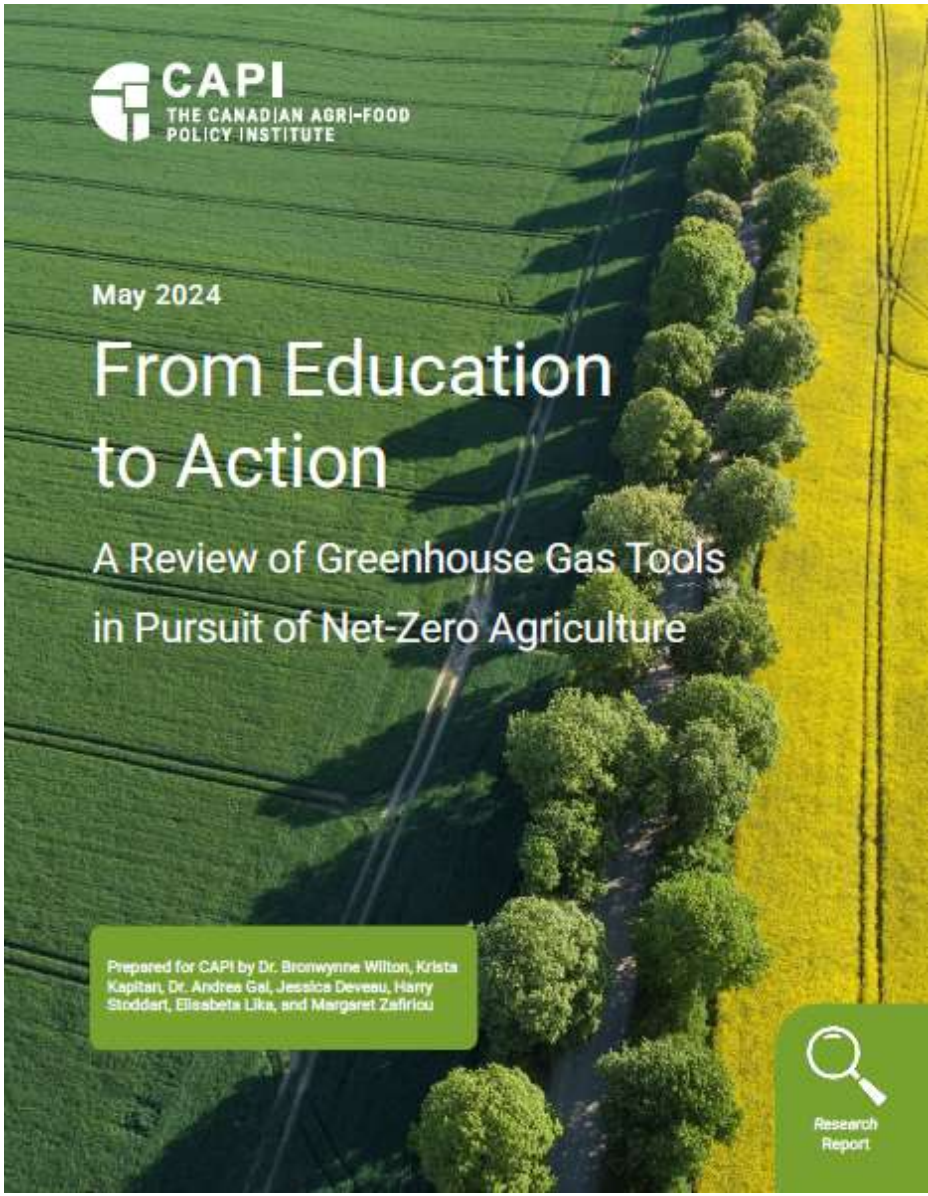
- Lack of regionally specific data
- Tool complexity and accessibility
- Whole-farm considerations
- Lack of interoperability and transparency between tools
- Science takes time
- Maturity of tools
- Economic and incentive alignment (i.e. lack of clear economic incentives)
- Data privacy and security concerns

"Transparency [in methods] and availability of information is likely to be a key concern where [GHG] tools are sought to inform policy, and hence is a potential limiting factor in the uptake of tools by policy makers. It may also limit the extent to which users can employ the tools make informed decisions on mitigation of emissions from farming systems."

– Sykes et al., 2017

Considerations

- **Fit for Purpose**
  - Each tool has a specific niche
- **Whole-farm approach**
  - Pro: single tool for mixed operator
  - Con: duplication of efforts and reporting
- **Data governance**
  - Methodology
  - Interoperability



Resources

1. A video from Eckard on the Australian GAF tools https://youtu.be/4sO7kZHgV30
2. CAPI Report “From Education to Action: A Review of Greenhouse Gas Tools in Pursuit of Net-Zero Agriculture”
3. CAPI Webinar on the role of Farm GHG Tools https://www.youtube.com/watch?v=ZRfBeDgDDL4