Holos

Website: http://www.agr.gc.ca/eng/science-and-innovation/science-publications-and-resources/holos/?id=1349181297838

Factsheet

General description of the tool

Category	Outcome-based
Objective	To estimate GHG emissions and help users identify ways to reduce farm emissions
Geographical applicability	Canada
Functionalities	Hotspots identification, soil carbon sequestration calculations, provide a footprint value/metrics
Target audience	Farmers, searchers, life-cycle assessment practitioners, developers of decision support tools, environmental NGOs, CSOs, international governments, intergovernmental organizations
Developers	Agriculture and Agrifood Canada (AAFC) - latest update: 2015
Format	Software to download
Cost (tool and data)	Free
Past or current users	Dairy Farmers of Canada, Canola Council of Canada, Canada Beef

Commodities covered

Barley, canola, chickpeas, dry bean, dry pea, fava bean, fodder, hay, lentil, potato, soybean, wheat, swine, poultry,

BMPs covered

Reduced tillage practices
Crop rotation, incorporating perennial or pulse crops
Fertilizer application - source
Application rate based on testing and book values
Cover crops
Fertilizer application - rate
Use of buffer zones for field crops*
Timing of application for plant needs**
Fertilizer application - timing**
Fertilizer application - placement**

**modelled partially (i.e. only in terms of carbon storage)*

*** identified as a possible improvement for a future version of the tool*

Indicators covered

GHG emissions
Land use
Soil carbon

Data inputs

Data requirements	Primary data required	Default values
Environmental conditions	Soil type and texture	Soil type and texture (default texture corresponds to the dominant one in the ecodistrict selected)
Crop management	Area of annual crops & fallow, area of perennial crops, area of grassland, tillage system, area of irrigation, herbicide usage	- Crops/grassland/land use change: fertilizer inputs, crop yields, soil type and texture
Carbon sequestration/storage	Lineal tree plantings/shelterbelts: Type of tree, age of planting, length of planting	No
Livestock	- Beef cow-calf: number of cows, type of grazing area, pasture and feed quality, feed additives in diet, spring or fall calving, year round grazing or winter feeding, calves sold or kept for backgrounding and number of months kept, manure handling system for backgrounders - Beef feedlot: type of feedlot (finishing or backgrounding), feedlot capacity and/or number of months filled, barn housing usage, ration mix, feed additive in diet, % steers in lot, feed:gain ratio (if known), average daily gain (if known), manure handling system - Beef stocker: number of cattle, number of months grazed, pasture quality, feed additives in diet, % steers in hed, average daily gain (if known) - Dairy: number of cows, number of months calves kept, feed additives in diet, pasture usage and length of time used, manure handling system, season of manure application - Swine: type of operation (farrow to wean,	- Beef cow-calf: calf crop rate, number of bulls - Beef feedlot: initial and final weights - Beef stocker: initial and final weights - Dairy: number of replacement heifers, bulls and calves, length of dry period, total digestible nutrients or net energy for lactation and protein content in diets (dry and lactation) - Swine: yearly birth rate, pre-weaning death loss - Sheep - market lamb: number of rams, lambing rate, number of lambs per birth
Energy use	No	No
Primary processing	No	No
Water	No	No
Transport	No	No
Others	No	No

Scope ☑ Farm level ☐ Supply chain

Ease of use for the data collector	Relatively easy, but may required specific documentation and time consuming - Qualitative data entries can be easily completed by the user. Data on crop areas and irrigation areas can be easily estimated by the producer. Quantitative data related to fertilizers and pesticides will require the user to search through its documents which should be accessible, but the user can also rely on default values. General description on tree plantings/shelterbelts can be easily provided by a producer, but not the specific details on the tree species. Any data entries related to livestock are easy for producer to fill. However, there is a lot of entries to be filled and producers may not be willing to commit a significant amount of time for this type of exercise.

Modelling methods

Consistency of the model with the goal and scope of the tool	Consistent - calculation of GHG emissions specific to the farm at the province/ecozone level which help estimate of the impacts and identify the hotspots
Transparency and quality of documentation	Guidance document: Yes - the methodology and guidance for the tool are included in on document available online: http://publications.gc.ca/collections/collection_2009/agr/A52-136-2008E.pdf Methodology document: Yes - the methodology and guidance for the tool are included in on document available online: http://publications.gc.ca/collections/collection_2009/agr/A52-136-2008E.pdf
Conformity of the methodology with the current state-of-the-art agronomic and environment sciences	Consistent - use of IPCC and all other models which are adapted to the Canadian context
Methodology	- Based on the Intergovernmental Panel on Climate Change (IPCC) methodology adapted for the Canadian context - CO2 emissions or removal from soil carbon change is estimated with the methodology developed for the National Inventory Report, the Canadian Agriculture Monitoring Accounting and Reporting System (CanAG-MARS) Approach: "to emphasize the interaction of various components on the farm, rather than use exceedingly complex sub-routines of individual facets"
Dataset sources used for modelling	- CO2 emissions from energy use: National Inventory Report, Bioenergy Feedstock Information Network (BFIN), Dyer and Desjardins (2007), Nagy (2000), Vergé et al (2007), Harms and Helgason 2003 - Soil and topography: Canadian Soil Information System (CanSIS), National Ecological Framework (Marshall et al., 1999), Rochette et al. (2008) - Feed (energy, dry matter intake, average daily gain): National Research Council (2001), Greenhouse Gas System Pork Protocol (2006)

Outputs / Results

Results ☑ Detailed summary of results in tables ☑ Detailed summary of results in graphs

Analysis ☑ Comparison with alternative scenarios

Limits of the tool/model

- Cannot compare in one single report/table/graph GHG emissions of different alternatives and the current scenario
- Use of many assumptions in the model that can affect the results regarding land use, feed intake, manure spreading, etc.