| Practice-based<br>or outcome-<br>based   | Outcome-based   |  |  |  |  
  |  
  |  
  |  
   |  | Practice-based  | Practice-based and Outcome based   
  | Data sources  |
|--|---|--|--|--
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Tools / Data sources General information Objective	
  | To demonstrate<br>compliance with the<br>GHG emissions<br>requirements of the EU<br>Renewable Energy<br>Directive  
  | t Alberta<br>Environmental<br>Footprinter<br>To establish a credible<br>and transparent<br>environmental profile<br>U of egg production in<br>Alberta accounting for<br>current farming  
  | To facilitate the trading of Inutrient (nitrogen and phosphorous) credits to reduce in water pollution To estimate on-farm nitrogen and phosphorus losses and compared to the stimate on-farm nitrogen of the stimate on-farm  
   | producers with their<br>irrigation scheduling<br>decisions (simulates the<br>growing conditions and<br>(crop water use for 52  | To evaluate the economic costs,<br>water quantity and quality benefits<br>and cost effectiveness of<br>agricultural BMPs across a<br>watershed. The tool, which was<br>e_set_etc). designed to be user-friendly for<br>strategic planning; or to harmonize  | A)<br>Sed as<br>To help dairy farmers understand the benefits of regionalized best<br>management practices and identify the ones that they are or are not<br>yet implementing<br>ty<br>To allow dairy farmers to benchmark themselves with other producers<br>in Canada and in the province<br>To provide environmental footprint results that farmers can compare   
  | AgroClimatic Information Service<br>(ACIS)       Water Quality in Alberta's<br>(ACIS)       Agricultural Water<br>Survey (AWS)       Assessment of Environmental<br>Sustainability in Alberta's<br>Agricultural Watersheds Project       Manure application effects<br>and Runoff Phosphorus in<br>southern Alberta       Trends in residual soil nitrogen<br>and Runoff Phosphorus in<br>Small Alberta Watershed       The National Soil DataBase<br>(NSDB)       Environmental Sustainability<br>of Canadian Agriculture       Tools       Data         Image: Supplementary in the figure of the states and dig to in the states and and aprove of the states and approve the states and approve the states and approve of the states and  |
| Developers/Authors   | Unilever and research<br>University of Aberdee  | change compound feed composition, i<br>upstream production) to reduce GHG<br>emissions<br>To help organizations report on corpo<br>responsibility  | te   | environment and their production<br>efficiency   | comparison to (1) regional average<br>(2) his own farm over time and (3)<br>own farm under alternative<br>management scenarios   
  | es, To provide the carbon  
  | practices a<br>c<br>1<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7<br>7   
  | assess the credit generating<br>capacity from agricultural<br>management practices<br>To help farmers determine the<br>most cost-effective<br>conservation practice<br>alternatives  
   | different crops)     accurately and consistently       Metric data give consumers     buyers, and producers a colanguage for discussing the impact of farming practices the meaningful stewardship activities of U.S. farmers*       Alberta Agriculture and Forestry     SISC Coordinating Councorganizations   | r, farmers, watershed managers and communication between stakehold<br>s, food other conservation practitioners<br>mmon also allows to identify and target<br>s - and<br>p b key areas with the highest<br>p otential impacts. communication "   | of Groupe AGÉCO (with the participation of Dairy Research Cluster, Dairy Farmers of Canada, Agriculture and Agri-Food Canada, Canadian Dairy Network and Canadian Dairy Commission)  
  | meteorological stations operating in the<br>province of Alberta"       nutrients, saits, metals, pathogens and pesticides."       operators, governments and the<br>canadian public gain a better<br>understanding of the demand for<br>water and how it is used on<br>Canadian farms."       operators, governments and the<br>canadian public gain a better<br>understanding of the demand for<br>water and how it is used on<br>Canadian farms."       operators, governments and the<br>canadian farms."       appropriate<br>propriate<br>recommendations for the management<br>of ralle Phosphorus Export Model (EFPEM)<br>on soil and groundwater resources"       at the end of the cropping season"       the food and beverage industry)<br>- to compare the relationship with the Edge<br>of ralle Phosphorus Export Model (EFPEM)<br>for DRP (Wright et al. 2003)       at the end of the cropping season"       the food and beverage industry)<br>- to compare the relationship with<br>for DRP (Wright et al. 2003)       the end of the cropping season"       the food and beverage industry)<br>- to compare the relationship with<br>for DRP (Wright et al. 2003)         r       Alberta Agriculture and Forestry       Irrigation and Farm Water Division, Alberta       Statistics Canada       Mater Resources Branch, Alberta       Alberta Agriculture, Food and Agri-Food       Agriculture and Agri-Food Canadada       Agriculture and Agri-Food Canadaa       Agriculture and Agri-Food Canadaa       Irrigation Resources       Irrigation Branch, Alberta       Irrigation Branch, Alberta       Agriculture and Agri-Food Canadaa       Agriculture and Agri-Food Canadaa       Irrigation Irr   |
| Latest update<br>Format  | 2014<br>Online calculator or Yes (and has a specific<br>questionnaire potatoes)   | 2015<br>tool for No  | 2015<br>No   | 2016<br>Yes - https://www.fieldtomarket.org/c  | 2015<br>Jaici No   
  | 2014<br>No   
  | (4<br>N<br>d   
  | various state agencies<br>(enhanced version of the<br>Nutrient Trading Tool<br>developed by USDA and World<br>Resources Institute, 2006)<br>2014 2<br>Yes N  
   | 2015 2013<br>No No   | Rural Affairs 2015 2014 Yes - to be developed No  | 2016<br>Yes  
  | Up-to-date (2016)       2015       2005       2008       2003       2006       2011       2013       2010       20   |
| Cost (tool and data)   | Offline tool (e.g.<br>Excel tool)<br>Free for farmers<br>Annual fees for large o<br>or SME (3,000 pounds<br>pounds per year)<br>Fee-paying features su<br>saving analytical resul   | d and<br>corporate<br>s to 7,500<br>uch as   | Yes - software to download<br>Free   | No   | Yes<br>Free (at the moment, available to<br>producers in pilot workshops)  
  |  
  | No Yes - possibility to get N<br>the tool on a usb key Free - for Alberta Egg pr F   
  | c<br>H<br>a<br>F   
   | Yes - software to<br>download<br>http://www.stewardshin<br>a.ca/acis/imcin/aimm.js<br>p<br>Free Free Free  |   | No<br>Free for all dairy farmers: access to all of the sections of the tool)<br>Free for other users (without a producer number): access to BMP<br>database only (no access to the questionnaire or other sections of the<br>tool)   
  | Free         Free <th< td=""></th<>   |
| Geographical<br>applicability<br>Current/past users  | Canadian Pulse Growe<br>Association, Heinz, Ur<br>Descient Meinz, Ur  | nilever,   | Canada<br>Canada<br>Dairy Farmers of Canada, Canola Council of<br>Canada, Canada Beef  | McDonald's Corp, CocaCola, Unilever  | Canola Growers Association, Canad  
  | dian   
  | Alberta U<br>Alberta gg farmers u  
  | USA A  
   | Alberta USA<br>unknown unknown   | Only applied to a case study (Gully<br>Creek, ON) but "has the potential<br>to be transferred to other<br>watersheds" and "should be<br>expanded to include more BMPs<br>for use in other watershed across<br>Canada"       International         At the pilot stage for one<br>watershed       unknown   | Canada   
  | Aberta       Alberta  |
| Website  | PepsiCo, Marks & Spe  | ntcol.org/C http://webapplicaties.wur.nl/software  | feed http://www.agr.gc.ca/eng/science-and-   | and Walmart  | Association of Agri-Retailers, Pulse<br>Canada, General Mills, Grain Farme<br>of Ontario, Enns Brothers, Prairie C<br>Growers Association, Syngenta,<br>Manitoba Pulse Growers Associatio<br>Farmers Edge, CropLife Canada,<br>AgriTrend, Canadian Fertilizer<br>Institute, Ducks Unlimited Canada   
  | ers<br>Dat<br>on,  
  | ın n/a h   
  | http://nn.tarleton.edu/nttWeb h  
   | http://agriculture.albert http://www.stewardshi  | pinde http://www.agr.gc.ca/eng/?id=128 http://www.fao.org/3/a-i4113e.pd   | If dairyfarmsplus.ca   
  | htp://sgriculture.alberta.ca/acis/about.jp http://www1.agric.gov.ab.ca/SDepartment / http://www1.agric.gov.ab.ca/S  |
| Goal and scope<br>Main target audience   | oolFarmTool   | http://webapplicaties.wur.nl/software print/ Yes Yes Yes No  | innovation/science-publications-and-<br>resources/holos/?id=1349181297838 Yes No No Researchers, life-cycle assessment practitioners, developers of decision   | https://www.fieldtomarket.org/calcula<br>Yes<br>Yes<br>Yes<br>Yes  | Yes Yes No No  
  | Calc http://www.canolacou<br>cil.org/media/560794/c<br>opcflookup_1.0.xlsx<br>Yes<br>Yes<br>No   
  | /cr 0  
  |  
   | http://agr/culture.albert     http://www.stewardship       a.ca/acis/imcin/aimm.js     x.org/metric_calculator.       y     Yes       Yes     Yes       No     Yes       No     Yes  |   | tt dairytarmsplus.ca<br>Yes<br>No<br>No<br>No  
  | http://agriculture.alberta.ca/acis/about/so       http://www1.agric.gov.ab.ca/SUbepartment  |
| Commodities covered  | Animals and crops         Wheat       Yes - spring and winte         Canola seed       No         Live cattle (excl.       No         Purebred)       No         Barley       Yes   | er wheat No<br>No<br>Yes<br>No   | support tools, environmental NGOs, CSOs,<br>international governments,<br>intergovernmental organizations<br>Yes - durum, spring and winter wheat<br>Yes<br>Yes<br>Yes   | Yes - durum and winter wheat<br>No<br>No   | Yes - durum, spring and winter whe<br>Yes<br>No  
  | eat No<br>Yes<br>No<br>Yes   
  | No         Y           No         N           No         N           No         N           No         Y   
  | Yes - winter wheat Y<br>No Y<br>Yes Yes Y  
   | Yes - spring and winter No<br>wheat<br>Yes No<br>No No<br>Yes No   | and agencies       Yes  | No           No           No           No           No   
  | Image: select   |
|  | Potato     Yes -One specific tool<br>growers (PepsiCo and<br>Foods involved in the<br>development of this to       Pulse crops     Yes - dried bean, soyb       Crude animal and<br>plant products     Yes - dried bean, soyb       Raw hides and skins     No       Products and by-<br>Beef (Fresh, Frozen,<br>Chilled, incl. Offal)  | McCain<br>ool)   | Yes<br>Yes - chickpea, dried bean, dried pea, fava b<br>No<br>Yes  | Yes<br>be Yes - soybean<br>No<br>No  | No<br>Yes - dried pea, lentil<br>No<br>No  
  | No<br>No<br>No<br>No   
  | NO Y<br>NO Y<br>NO NO N<br>NO NO   
  | Yes Yes Y<br>Yes - kidney bean Y<br>No No No No  
   | Yes Yes<br>Yes - dried bean Yes - dried pea<br>No No<br>No No  | Yes   | No<br>No<br>No   
  | Image: series of the series   |
|  | Pork (Fresh, Frozen, No<br>Chilled, incl. Offal)<br>Canola/Mustard oil - No<br>crude<br>Processed potatoes No<br>Prepared animal<br>feeds<br>Oilseed cake and<br>meal   | Yes<br>No<br>No<br>Yes<br>No   | Yes<br>No<br>No<br>No  | No<br>No<br>No<br>No<br>No   | No   
   | No<br>No<br>No<br>No<br>No  
   | No         N  
   | No P<br>No No No P<br>No P  
  | No N   | Yes     Yes       Yes     Yes       Yes     Yes       Yes     Yes       Yes     Yes       Yes     Yes   | No<br>No<br>No<br>No  
   | Image: select   |
|  | Mair toasted or not<br>roasted<br>Canola/Mustard oil -<br>Refined<br>Honey No<br>Tallow No<br>Egg No<br>Chicken No<br>Bovine semen,<br>purebred semen,<br>live hogs, other live   | No           No           No           No           No           No           Yes           No   | No           No           No           No           No           Yes           No  | No<br>No<br>No<br>No<br>No<br>No<br>No   | No   
  | No<br>No<br>No<br>No<br>No<br>No<br>No   
  | No         N           No         N           No         N           No         N           Yes         N           No         N           No         N  
  | No N   
   | No         No  | Yes     Yes   | No   
  | Image: state in the state  |
| Indicators assessed  | Land use No Conservation/biodiv ersity Soil carbon No Soil erosion No Water use No Water quality No   | Yes<br>Yes<br>No<br>No<br>No<br>No<br>No<br>No<br>No<br>No   | Yes<br>Yes<br>No<br>Yes<br>No<br>No<br>No  | Yes<br>Yes<br>Yes<br>Yes<br>No<br>Yes<br>Yes   | Yes<br>Yes<br>No<br>Yes<br>Yes<br>No<br>No   
  | Yes<br>No<br>No<br>No<br>No<br>No<br>No<br>No  
  | Yes         N           Yes         N           No         N           No         N           No         N           Yes         N           No         N           No         N           No         N           No         N           No         N           No         N   
  | No N   
   | No         No           No         No           No         No           No         Yes           No         No           No         Yes           Ves         Yes           Yes         Yes           No         No  | Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes  | Yes<br>Yes<br>No<br>No - "In accordance with the IDF Guidelines, soil carbon was excluded<br>from the boundaries. Despite the fact that there is an important<br>opportunity for sequestration based on better management of soils,<br>too much uncertainty exists on the few models established."<br>No<br>Yes<br>No  
  |   |
|  | Energy use No Eutrophication No Acidification No Fossil fuel depletion No Nutrient use (nitrogen, phosphorus) Nutrient losses (nitrogen and phosphorus) Others No   | Yes           Yes           Yes           Yes           No           No  | No           No           No           No           No           No           No           No           No   | Yes<br>No<br>No<br>No<br>No<br>No<br>No  | Yes           No           No           No           No           No           No  
  | No           No           No           No           No           No           No           No  
  | Yes     N       Yes     N       Yes     N       No     N       No     Y       No     N   
  | No N   
   | No         Yes           No         No           No         No           No         No           No         Yes           No         Yes           No         No   | Yes<br>Yes<br>Yes<br>No<br>Yes<br>Yes<br>Cost of BMPs   | No           No           No           No           No           No           n/a  
  | Image: series of the series   |
| Scope (farm-level,<br>supply chain)  | Farm-level Yes  | Yes  | Yes  | Yes  | Yes  
  | Yes  
  | Yes Y  
  | Yes Y  
   | Yes Yes  | Cost effectiveness of BMPs<br>Many other indicators (over 100) rn<br>to environmental integrity, good<br>governance, social well-being and<br>economic resilience<br>(http://www.fao.org/fileadmin/ter<br>es/mr/sustainability_pathways/doc<br>A_Indicators_final_19122013.pdf)<br>Yes  | mplat<br>:s/SAF  
  | Yes   |
|  | Supply chain     No       Hotspots     Yes       identification     No       Alternative     No       scenarios testing     Soil carbon       Soil carbon     Yes       sequestration     calculations       Provide a footprint     Yes       value/metrics     No   | No<br>Yes<br>Yes<br>No<br>Yes<br>No<br>No  | No<br>Yes<br>Yes<br>Yes<br>No  | No<br>Yes - the base scenario can be compare<br>directly with national, state and county<br>No<br>Yes<br>No  |  
  | No<br>No<br>No<br>No<br>Yes<br>No  
  | Yes     N       Yes     N       Yes - what if scenarios     Y       No     N       Yes     Y       No     N       No     N   
  | Yes No F   
   | No N   | No     Yes       Yes     Yes       Yes - can "construct what if<br>scenarios, including the     No       No     Yes       Yes     No       Yes     No       Provide "an optimal set of BMPs.     No   | No         Yes         Not directly, but possible to create different projects and compare the results         No         Yes         Provide an action plan with BMPs that the farmers are not yet  
  | Image: A state in the stat   |
|  |   |  |  |  |  
  |  
  |  
  |  
   | crop water requirements<br>and irrigation timing   | with locations and types within the<br>watershed to achieve the<br>environmental target with<br>minimized BMP cost" or with a<br>specified budget constraint.   | implementing; provide literature on BMPs and their benefits; show a<br>benchmark of BMPs and environmental footprint against provincial<br>and national averages (for environmental footprint, it is possible to<br>select the functional unit)  
  |   |
| Ease of use for a non-<br>expert user<br>Modelling methods<br>Dataset sources  | sets<br>Fertilizers: EFMA (pub<br>ELCD database for 200<br>2011), ecoinvent (200<br>Kongshaug (1998), Toi<br>(2005), Smith et al (19  | hed data<br>FAOstats, Eurostat, publicly available:<br>FAOstats, Eurostat, public research res<br>lished in<br>66 and<br>2), experts: stakeholders of CFPAN workin<br>group<br>997), - Feed: average nutritional quality of f<br>materials from Dutch feed list of the   | <ul> <li>- Soil and topography: Canadian Soil Information<br/>System (CanSIS), National Ecological Framework<br/>(Marshall et al., 1999), Rochette et al. (2008)</li> </ul>  | Productivity estimates through 2010<br>from NASS, 2007 Agricultural Census a<br><sup>5</sup> 2008 Farm and Ranch Irrigation Survey<br>2002 and 2007 soil erosion data from<br>NRI new ARM survey data and updated<br>fertilizer use data by crop   | nd 2011 Census of Agriculture data<br>(Canada), CANSIM and National<br>Resource Inventory (NRI) of the US  
  | (not many field to<br>complete and every<br>Not disclosed  
  | provided by Eggs A<br>Farmers of Alberta E<br>(bird strains, eggs produced, cage type, N<br>etc) and by 35 farmers C<br>through a mail-in S<br>survey in 2011 g<br>Secondary data were ii  
  | "Web-based linkage to the E<br>Agricultural Policy f<br>Environmental eXtender (APEX) i<br>model and () to the USDA<br>Natural Resources<br>Conservation Service's Web Soil<br>Survey to utilize their<br>geographic information system  
   |  | the project was to design a tool<br>that is interactive and not complex   | User-friendly interface<br>Environmental LCA:<br>- Feed grown and purchased manure practices, pesticide use, herd size,<br>milk produced, fat and protein content energy consumed, water<br>consumed: surveys sent to farmers<br>- Diet proportion (%), manure storage practices, fertilizer used in each<br>province, ammonia emissions at farms: literature (Sheppard et al.,<br>2010; 2011)<br>- Transportation distances for milk, purchased feed sources, manure<br>spreading tendencies: provincial associations<br>- Provincial crop yields, average crop surfaces per farm, herd size, milk  
  | Vesse       The executive summary provides a good overview of the project and its results, but it conview of the project and its results, but it conview of the project and its results, but it conview of the project and its results, but it conview of the project and its results, but it conview of the project and its results, but it conview of the project and its results, but it conview of the project and its results, but it conview of the project and its results, but its results are not conview of the project and its results, but its results are not conview of the project and its results, but its results are not conview of the project and its results, but its results are not conview of the project and its results, but its results are not conview of the project and its results, but its results are not conview of the project and its results, but its results are not conview of the project and its results, but its results are not conview of the project and its results, but its results are not conview of the project and its results its   |
| Methodology  | Based on peer-reviewed<br>specified) and IPCC Tier<br>factor approaches and T<br>based models<br>- GHG emissions:<br>Scope 1: fuel and energy<br>livestock enteric fermen<br>livestock manure<br>management/storage, sc   | ier 3 process- For GHG emissions calculations at the nat<br>level, the LCA methods were consistent wi<br>IPCC requirements<br>use, - For methane emissions from enteric<br>tation, fermentation: Tier 3 method used in the D<br>National Inventory Report  | Climate Change (IPCC) methodology adapted for<br>nal the Canadian context  | for GHG emissions, USLE methodology<br>for soil erosion, IPCC assumptions for<br>N2O emissions, etc.,<br>e   | <ul> <li>Holos methodology</li> <li>Soil organic carbon change (SOCC<br/>methodology developed by AAFC (r<br/>crop-specific)</li> <li>Soil erosion: methodology develo<br/>by AAFC (crop-specific) using Canac<br/>soil data and algorithms (AAFC's SO</li> </ul>  
  | calculation based on th<br>results of a study done<br>in 2014<br>oped<br>dian  
  | ecoinvent database<br>(crop production,<br>electricity at grid,<br>natural gas, fuel and<br>transportation)<br>Based on LCA B<br>methodology and<br>environmental impacts<br>with IMPACT 2002+<br>method (climate<br>change, resource<br>depletion, human  
  | bad soil information"<br>Builds on previous Nutrient L<br>Trading Tool methodology (<br>e<br>r<br>t<br>t   
   | Society of Civil Engineers<br>(ASCE) standardized<br>evaportarnspiration<br>equation for calculating<br>reference<br>evapotranspiration and<br>the reference   | Soil and Water Assessment Tool<br>(SWAT) for estimating water<br>quantity and quality benefits of<br>BMPs, and the integrated<br>economic-hydrologic model for  | production: Statistics Canada<br>Y Environmental LCA is based on the International Dairy Federation (IDF)<br>Guidelines (IDF, 2010) on carbon footprints and ISO 14040-14044 standards   
  | b       Pathogen sampling was done at 21 sites, twice during the year       Pathogen sampling was done at 21 sites, twice during the year       Image: Constant C  |
| Emission factors   | crop residues, fertilizatio<br>biomass inputs, carbon<br>sequestration, land use of<br>Scope 2: electricity prod<br>Scope 3: production of f<br>primary processing, prim<br>distribution<br>Description - Pesticides: Audsley<br>Harmonisation 1997   | on and live weight of a specific animal, for eggs of<br>of fresh eggs, and for milk 1 kg of FPCM let<br>the farm-gate - Allocation methodology: based on ISO 14<br>ertilizers, rules and Dutch horticulture protocol<br>and animal materials is considered to be pr<br>the short carbon cycle . So, carbon in crops<br>- Manure storage emissions: IPCC and<br>Dutch National Inventory Report<br>- Transport: ecoinvent   | kg exceedingly complex sub-routines of individual<br>facets"<br>- N20 emissions: IPCC (2006)<br>- Land use: CanAG-MARS and IPCC<br>- Enteric fermentation and manure (CH4<br>and N2O): IPCC, Vergé et al (2006) for dairy  | - Fertilizer: GREET model version 1.8d<br>(US Department of Energy Argonne<br>National Laboratory)     - Crop protection products: Cranfield<br>University (2009)     d - Machinery: West and Marland (2002)   | al. (2008)<br>- Others: based on data run provide<br>by AAFC (2015)  
  | tion<br>i's<br>e et unknown  
  | health, ecosystem<br>quality and water<br>withdrawal)<br>The models for<br>methane and NO2<br>emissions associated<br>with the hens end of<br>- IMPACT 2002+ (IPCC) n  
  | c<br>F<br>F<br>C<br>C<br>F   
   | evapotranspiration was<br>calculated using the<br>Penman Montieth<br>procedure as outlined in<br>Food and Agricultural<br>Organization document,<br>FAO 56<br>n/a n/a  | examining cost effectiveness of<br>BMPs. The interface is a decision<br>support system (DSS) for<br>conducting watershed evaluation<br>of agricultural BMPs by<br>conservation practitioners and<br>farmers."   | Canadian Centre for Occupational Health and Safety - Designing an effective<br>PPE program, Alberta Agriculture and Forestry - How to make your own farm<br>first aid kit, CanadaFarmSafe (2011) - Canada Farm Safe Plan, Commission for<br>Labor Cooperation - Guide to On-the-Job Safety and health, OMAFRA -<br>Agricultural Employees, Colombani-Lachapelle (2009). L'organisation du travail<br>en agriculture: un moyen d'amélioretia rentabilité et la qualité de vie sur les<br>fermes, COOP fédérée (2013) - La Gestion d'urable d'une entreprise agricole,<br>Bélanger (2012). Construction d'un outil d'évaluation de la durabilité des<br>- N20 from crops: IPCC<br>- NH3 from crops: IPCC<br>- Pesticides: Fantke et al., 2011<br>- Phosphorus from crops: Nemecek (2007), based on SALCA-P model (Prasuhn,<br>2006)<br>Metals in manure: based on supplementation to the system,
analysed for<br>sensitivity<br>- Nirtat from crops: Nemecek (2007), based on Richner et al., 2006  | shipe and a second  |
|  | Generic - IPCC Yes<br>Generic - GHG Yes<br>Protocol<br>Generic - DEFRA Yes<br>Generic - EIA Yes<br>Generic - EPA Yes  | Yes<br>No<br>No<br>No  | Report (1990-2005), Bioenergy Feedstock<br>Information Network (BFIN)<br>Yes<br>No<br>No<br>No   | - Soil nitrous oxide from nitrogen<br>application: IPCC<br>- Methane emissions from rice fields: L<br>EPA annual inventory of GHG<br>Yes<br>No<br>No<br>No   | JS<br>Yes<br>No<br>No<br>No  
  | unknown<br>unknown<br>unknown<br>unknown<br>unknown  
  | Yes n<br>No n<br>No n<br>No n  
  | n/a r<br>n/a r<br>n/a r<br>n/a r   
   | n/a n/a<br>n/a n/a<br>n/a n/a<br>n/a n/a<br>n/a n/a  | n/a<br>n/a<br>n/a<br>n/a  | Enteric CH4: IPCC Tier 2, while for the Ym, daily CH4 emissions based on Ellis, 2007     Manure CH4 and N2O: IPCC Tier 2     Manure NH3: IPCC Tier 1     Housing NH3: based on Sheppard et al, 2011b     Others: IMPACT World+ LCIA method     Yes     No     No     No     No     No     No     No  
  |   |
| default values<br>Flexibility for update<br>and change   | Generic - National im No<br>Specific User can modify the d<br>Possible to update<br>or change default<br>values to refine the estimate<br>Not flexible for update<br>but the database is to   | e Excel tool<br>e entered<br>b by user,<br>be by user,<br>be by user, Not flexible for update by user, but th<br>database is to be updated on an on-go   | Not flexible for update by user, but the database is to be updated on an on-going  | er<br>ec n/a - no default value<br>Not flexible for update by user, but the<br>database is to be updated on an on-   | No Site-specific emission factors n/a - no default value Flexible - will be updated on an anr  
  | unknown<br>Study performed in fall<br>Not possible to change   
  | e al If user has a separate L<br>meter for energy v<br>measurements, the in<br>Alberta average for<br>annual energy<br>consumption set as a<br>default can adjusted<br>Not flexible for update F<br>by user, but the   
  | values directly on the user c<br>interface<br>Flexible for user to update in the   
   | n/a n/a<br>n/a n/a<br>Yes - the user can overri<br>the default values direct<br>the tool<br>Weather data are<br>quality-controlled and   | ly in<br>Flexible - in order to add more n/a<br>watershed to the tool, the  | No IMPACT World+, Nemecek (2007), Sheppard et al. (2011) Yes - the user can overwrite the default values for optional entries Flexible - it is possible to import an Excel file with new or modified questions to be added or removed to the tool  
  | added over time (for the Alberta Climate 2015. If the project continues in the coming latest survey available was done in 2008, but is based on data collected published in 2003, but is based on the fruit of a 3- Census of Agriculture data which are  |
| background datasets  | the developers (emiss<br>factors are updated of<br>embedded fertilizer<br>emissions are the mos<br>frequently updated)  | ften,<br>roduction<br>st   |  | going basis by the developers  | The averages are determined using  
  | g n/a - There is no compa  
  | database is to be<br>updated on an on-<br>going basis by the<br>developers<br>ari n/a - There is no n  
  | f<br>ii<br>F<br>N  
   | acquired more<br>frequently than<br>irrigation scheduling<br>models used in other<br>parts of<br>North America   | following data are required:<br>- Basic datasets need to be<br>prepared for topography, landuse,<br>land management, soil, climate,<br>water quantity and quality,<br>and BMPs.<br>- Farm economic, watershed<br>hydrologic and integrated<br>modelling need to be set up,<br>calibrated and validated.<br>- The open source GIS interface<br>needs to be transferred to the new<br>study site by linking the three<br>modelling components with the<br>Users can compare against two n/a   | Averages are calculated from the other tool users' inputs.   
  | and Atlas Maps)       year, it will be possible to perform anual data update to suight erse information may this test information for current and future studies animality growides a reliable frequently, but the long period of sampling provides a reliable frequently, but the long period of sampling provides a reliable baseline.       wear field study, such a report may not be updated frequently, but the long period of sampling provides a reliable frequently, but the long period of sampling provides a reliable baseline.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       wear field study, such a report may not be updated frequently.       we  |
| averages: how are<br>the averages<br>determined and<br>updated   |   |  |  | sources depending on the indicator:<br>National Agricultural Statistics Service,<br>Agricultural Census, Farm and Ranch<br>Irrigation Survey, NRI new ARM survey<br>data<br>"Where national averages are<br>constructed through the aggregation a<br>weighting of various practices and<br>geographies, the weighting was typical<br>performed on a planted acre basis due<br>to the fact that most data underlying t<br>indicators were expressed on a per acr<br>basis"  | Agriculture, CANSIM and National<br>Resource Inventory (NRI) of the US<br>National Resources Conservation<br>Service (NRCS).   
  | 5  
  | comparison with w<br>averages  
  | -  
   | comparison with<br>averages  | baseline scenarios:<br>- Historical scenario (with existing<br>BMP distribution)<br>- Conventional scenario (without<br>BMPs)<br>"The historical scenario is<br>developed based on producer<br>survey of BMPs, which shows<br>cumulative efforts of BMP<br>implementation. The conventional<br>scenario is developed through<br>model by removing all BMPs,<br>which represents the conventional<br>agriculture situation without   |  
  | to calculate averages for comparison<br>purposes. used to calculate avera   |
| Consistency of the<br>model with the goal<br>and scope of the tool   | emissions for a number  | on of GHG<br>consistent - calculation of entire life cr<br>impacts of feed supply (including<br>utilization) which helps identify the<br>hotspots and test alternative scenario  | specific to the farm at the province/ecozone level which help estimate of the impacts  | e in terms of environmental impacts and  | specific data on environmental   
  | provides a single result<br>for the carbon footprin<br>nit of 1 tonne of crop to<br>e to quickly check for<br>rers compliance with EU  
  | t allows the calculation t<br>of 5 environmental c<br>indicators to provide n<br>an environmental<br>profile of egg  
  | the calculation of credits that<br>can be traded on the nutrient<br>market<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c<br>c  
   | prediction of crop water reporting of specific   | agriculture situation without<br>vs the Consistent - the tool helps users Consistent - the outcomes of the to   | ucers environmental impacts and assess their management practices and<br>r benchmark them against the average<br>ive   
  | Image: A concernent of the status provides of the status pro   |
| quality of the   | Guidance document<br>or instructions<br>available     Yes - A guidance docu<br>the online tool is avail<br>online:<br>https://app.coolfarmt<br>tic/doc/CFT_Online_N_<br>beta.pdf       Methodology<br>document available     Not publicly available   | lable<br>:col.org/sta<br>/lanual   | tool are included in on document available<br>online:<br>http://publications.gc.ca/collections/collect<br>on_2009/agr/A52-136-2008E.pdf<br>Yes - the methodology and guidance for the  | ti<br>Yes - Methodology available online:<br>https://www.fieldtomarket.org/report  | Yes - documentation on the<br>/n methodology will be available, but  
  | given directly in the too  
  | ol given directly in the tr<br>tool d<br>d<br>cy Yes - background T<br>information on the n  
  | tool online (http://pa-cdemo.nutrientnet.org/guide/in cdex.app) r  
   | document available available online<br>http://www.stewardship<br>http://www.imcin.net/ai<br>x.org/docs/Guide-SISC-<br>Calculator_2013-Oct.pdf<br>A summary document is<br>available online: (Applied water use effici  | f Tics The methodology is detailed in Yes - a detailed methodology is availency, published papers online:   | as the tool is designed to be as intuitive as possible<br>ailable Yes - a methodology document will be made available to users. The<br>LCA study (Quantis et al, 2012) from which the methodology was taken  
  | h - Definitions and background information on<br>the methodology are provided in a the methodology for the survey comprehensive and<br>the methodology are provided in a the methodology are provided in a the methodology for the calculation of the methodology for the calculation of the methodology for the calculations of each indicator is available online:  |
|  | document available  |  | tool are included in on document available<br>online:<br>http://publications.gc.ca/collections/collect<br>on_2009/agr/A52-136-2008E.pdf  | ational-2/PNT_NatReport_A27.pdf  |  
  | information publicly   
  |  
  | online ł   
   | available online: (Applied water use effici<br>http://www.imcin.net/ai<br>nitrogen use, phosphorc<br>use and soil organic mat<br>are available online:<br>http://www.stewardshi<br>x.org/working_metrics.p   | bus http://www.fao.org/fileadmin/tem<br>s/nr/sustainability_pathways/docs<br>_Indicators_final_19122013.pdf   | nplate is already available publicly.<br>/SAFA   
  | n the methodology are provided in a describes the methods in detail. is available online:<br>document available online:<br>(http://agriculture.aberta.ca/acis/docs/stati<br>on-viewer-explained_v2025_m0d_u21.pdf)<br>-Methodology for the export-<br>calculation is available online:<br>(http://agriculture.aberta.ca/acis/docs/stati<br>calculation is available online<br>(http://agriculture.aberta.ca/acis/docs/stati<br>calculation is available online<br>(http://agriculture.aberta.ca/acis/docs/stati<br>in detail.thtp://www.arcreateration.ca/calculation is available online<br>(http://agriculture.ab  |
| Consistency of the<br>methodology with<br>the current state-of-<br>the-art agronomic<br>and environment<br>sciences  | sensitive empirical mo<br>from hundreds of pee<br>studies" and "sits betw   | and LCA standards (ISO       r-review       dud0/14044/14067, PAS2050, IPCC       ween     Guidelines for National Inventory Republic       ble emission     IDP Guide to standard LCA)       CC Tier 1)     Johels that       l of data     Interview   | models which are adapted to the Canadian context   |  | re are representative of the region,<br>- based on well-developed<br>methodology, and uses the Field to<br>re Market FieldPrint work as a reference<br>DA  
  | (according to the<br>information available) -<br>o carbon footprint values<br>nce are approved for the   
  | mainly primary data t<br>from the farmers and s<br>Egg Farmers of Alberta n<br>to represent<br>adequately the reality<br>and uses LCA<br>methodology that is<br>widely recognized  
  | to account for changes in<br>science (e.g. APEX model) and<br>newly available data<br>e<br>f<br>r  
   | American Society of Civil straightfoward as the to   | ol farm economic model for practices are based on multiple cre<br>quantifying the costs of BMPs, the sources (IPCC, FAOSTAT, EPA, WHC   | edible the Canadian milk industry, using the well recognized LCA   
  | Consistent - The tool provides up-to-date<br>data and uses atmadratized methodology<br>developeds a standardized methodology.<br>Canada appropriate<br>calculation.<br>Consistent - The methodology is refined over<br>calculation.<br>Consistent - The methodology is refined over<br>developed and<br>canada appropriate<br>methodology.<br>Analyses of samples were done by<br>following standard procedures accredited<br>by the Canadian Association of<br>Environment's<br>Quality Assurance (QA) program to<br>"ensure that the data collected were<br>reliable and accurate for future analyses<br>and context for future analyses<br>and c                             |
|  | Environmental<br>conditions<br>Characteristics (textur<br>matter, moisture, drai<br>Crop management<br>(fertilizer u<br>(fertilizer name, nutri<br>product, application r<br>application method, e<br>inhibitors, fertilizer p<br>age of technology). pe<br>Carbon  | Feeding livestock: soil type of grasslar<br>ent or<br>ate,<br>missions<br>roduction-<br>esticide<br>anges e.g. No  | nití Area of annual crops & fallow, area of perennial crops, area of grassland, tillage system, area of irrigation, herbicide usage  | treatment, seeding rate, row spacing,<br>drainage system, share of economic<br>value, previous crop residue burned,<br>- Management: tillage system (practice<br>management system (scenario to pick)<br>crop residue removal. N credit taken  | field size, soil data (surface form,<br>slope class, observed wind erosion,<br>- Crop rotation: frequency, yield, cr<br>tile prior year<br>- Field operations: hours for<br>operations, tractor used, fertilizer<br>application (NPK rates, tractor used,<br>manure (application method, tract   
  | legal land description<br>(township, range,<br>rop No<br>d),   
  | Feed production: % of cf<br>fa<br>t<br>f<br>n<br>n   
  | - Soil: location, max depth,<br>slope, soil P, bulk density, sand r<br>%, silt %, organic matter %, pH i<br>Cropping system: amount of T<br>fertilizer applied and time of<br>application, seeding/planting<br>type and date, date of harvest,<br>nutrients applied, tillage<br>management<br>- Drainage Water Management<br>n/a r   
   | meteorological<br>information, soil<br>Type of crop, type,<br>planting date<br>planted, date of last har<br>fertilisation (date rage,<br>product, amount applied<br>acre, %n, %P205, %K2O  | provide feedback.  Geospatial data (i.e. DEM,<br>landuse, soil, stream network,<br>watershed and field boundary,<br>Imber - BMP and agricultural<br>es<br>west,<br>d per<br>),<br>r. soil<br>n/a  Practices related to GHG mitigation<br>GHG balance, air pollution prevent<br>soil improvement, land conservatio<br>and rehabilitation, ecosystem<br>chance, soecies conservation. aero<br>practices related to carbon   | n, Environmental LCA:<br>ion, - Feed production: yield (kg/ha wet)<br>n BMPs:<br>e - (Environmental stewardship: field operations) Soil management,<br>nutrient management, pest management<br>r<br>   
  | Image: series of the series   |
|  | (juvenile, adult produ<br>non-productive), feed<br>characteristics (% of d<br>feed mix, type of grazi   | f field<br>lent<br>lage, cover<br>anure<br>l biomass<br>system (tree<br>f trees per<br>of phases<br>ctive, adult<br>l Select the feed only)<br>Feeding livestock:<br>lite from<br>- for all livestock: ration of feed<br>ing, quality - for dairy only: amount of concentrati  | grazing area, pasture and feed quality, feed<br>additives in diet, spring or fall calving, year<br>round grazing or winter feeding, calves sold<br>or kept for backgrounding and number of   | 4  | No   
  | n/a  
  | egg produced, quantity<br>of birds and placement<br>dates, feed ration and<br>ingredients, barn size,  
  | Grazing: date and type of livestor   
   | n/a No   | <ul> <li>sequestration such as afforestation<br/>enrichment of soils with soil carbon<br/>enrichment of soils with soil carbon</li> <li>BMP and agricultural</li> <li>Practices related to animal health,<br/>management data</li> <li>humane animal handling, animal<br/>husbandry</li> </ul>  | n<br>Environmental LCA:<br>- Manure management: amount of manure applied in total<br>- Livestock: average number of dairy cows (in lactation and dry), dairy<br>cows bought, average distance between the provider and the farm,<br>average number of bred heifers, open heifers, bulls, female calve, male  
  |   |
|  | of grazing), manure<br>management (system,<br>system, number of da<br>system use)<br>Energy use<br>Electricity consumption<br>grid or local renewabl<br>consumption (by type  | ,% per<br>,% per<br>,% per<br>,% of<br>bodyweight at slaughtering, strategy of<br>feeding, water/feed ratio<br>- for breeding sows: farrowing per sow<br>year, age of weaning piglets, age of se<br>piglets, littersize (piglets born alive),<br>water/feed ratio<br>- for broilers: type of broilers, type of<br>growth curve, bodyweight at slaughter<br>- for laying hens: type of laying hens,<br>No<br>es and fuel<br>) at the  | months kept, manure handling system for<br>backgrounders<br>- Beef feedlot: type of feedlot (finishing or<br>backgrounding), feedlot capacity and/or<br>number of months filled, barn housing<br>usage, ration mix, feed additive in diet, %<br>steers in lot, feed:gain ratio (if known),<br>average daily gain (if known), manure  | f<br>- Product transportation/hauling:<br>distance from field to point of sale, fue<br>type  |  
  | ime fiNo   
  | Electricity and gas consumption  
  | n/a r  
   | n/a Electricity, diesel, gasolin<br>and other fuels usage  |   | calve, average number of cows and/or calves sold to slaugther<br>- Feed ration: feed composition, amount of each feed consumed by<br>dairy herd with percent purchased<br>BMPs:<br>- (Environmental stewardship: on-farm activities) Feeding strategy<br>- (Environmental stewardship: field operations) Manure storage<br>management  
  |   |
|  | Field (for irrigation and machinery)         Primary processing       Electricity consumption grid or local renewable energy consumption f burning biomass and in factory, waste wate containing organic con (quantity, oxygen dem treatment)         Water       No  | on from No<br>es and<br>from<br>fossil fuels<br>er<br>mpounds  | No<br>No   | Orying: drying system, energy source,<br>points of moisture removed by drying     No     - Farm demographics: total managed<br>irrigated acres, total managed non-<br>irrigated acres, total managed non-  | No   
  | No<br>No   
  | a<br>-   
  | and amount s<br>- Auto Irrigation and s  
   | - Capacity and operation Irrigation, water use<br>schedule of irrigation<br>system - Daily irrigation  | n/a       All practices related to each indicat also applicable to primary processi activities         - Flow and water quality data       Practices related to water conservat water pollution prevention  | ng   
  | Image: Constraint of the following data requirements:       Constraint of the follow   |
|  | Transport Quantity of products<br>transported by road, r<br>ship with distances (if<br>returns for road trans<br>Others No  | rail, air and<br>empty   | No<br>No   | No     - Conservation practices (select     practices)   | No<br>No   
  | No   
  | No n<br>No -<br>fri<br>P   
  | n/a r<br>Wetlands and Ponds: area, r<br>fraction of area controlled by<br>pond<br>Stream and Riparian<br>Management: stream fencing  
   | n/a No   | n/a No - Related agricultural economic No data  | Environmental LCA: none<br>BMPs: none<br>Environmental LCA:<br>- Milk sold in year of assessment, average milk fat content, average<br>milk protein content<br>BMPs:<br>- Worker's well-being: Labour relations, working hours, salary and   
  | Image: Instance of the second seco   |
| Default values   | Environmental No<br>conditions  | n/a  | Soil type and texture (default texture<br>corresponds to the dominant one in the<br>ecodistrict selected)  | n/a - no default value   | n/a - no default value   
  | n/a - no default value   
  | h<br>a<br>fr<br>b<br>p<br>s<br>s<br>s<br>v<br>v<br>v<br>v  
  | (number of animals, days,<br>hours/day in stream, type of<br>animal, dry manure, nutrient<br>fraction), streambank<br>stabilization, riparian forest<br>buffer (area, width, grass field<br>portion, buffer slope), Filter<br>strip (vegetation type, width,<br>strip slope), Waterway (grassed<br>buffer) (vegetation type and<br>width)<br>No  
   | - Climate information (we No   | Datasets for geospatial data<br>(digital elevation model, landuse,<br>soil, stream network, field and<br>watersteed benudary, and location  | fringe benefits, occupational health and safety, young workers,<br>integration, work-life balance<br>- Relations with local communities: relationships with neighbours,<br>local involvement, natural and built heritage<br>- Farm management: business planning, regulatory compliance,<br>continuous improvement, networking, participation to voluntary<br>standards<br>- Economic performance: financial management, innovation, risk<br>management, responsible sourcing<br>- Cattle management: animal health and animal welfare<br>- Environmental stewardship: on-farm activities: Biodiversity<br>Environmental LCA: none<br>BMPs: none   
  | Could be used to create default values:       - climate condition (temperature, wind, precipitation, humidity, drought indices)         - climate condition (temperature, wind, precipitation, humidity, drought indices)       - climate condition (temperature, wind, precipitation, humidity, drought indices)   |
|  | Crop management<br>(method - worst case   | ment - Source of feed (country)<br>as default) - Feed: dry matter, energy value, crude<br>protein, phosphorus<br>- Feed management: pesticides applie<br>manure applied, fertilizers applied,<br>machinery use, energy for storage, yie<br>harvest, weight losses  |  | r n/a - no default value   | n/a - no default value   
  | n/a - no default value   
  | eb   
  | Yes - user can upload an<br>existing cropping system<br>baseline scenario by selecting<br>the crop and the tillage   
   |  | e crop:<br>,<br>,<br>,<br>below   | Environmental LCA for feed production: nutrient and pesticide applied<br>for feed production (type and rate)<br>BMPs: none   
  | - soll (moisture, temperature)       - soll (moisture, temperature)       - climate       - wind erosion risk and practices       - wind erosion risk and practices       - climate       - wind erosion risk and practices       - climate       - wind erosion risk and practices       - climate       - climate       - wind erosion risk and practices       - climate       - c   |
|  |   | Any matter<br>- Housing, manure storage: "For each<br>animal product the most common Dut<br>farming system is assumed, implying a<br>average housing type, average manure<br>storage facilities etc."  | <ul> <li>bulls</li> <li>Beef feedlot: initial and final weights</li> <li>Beef stocker: initial and final weights</li> <li>Dairy: number of replacement heifers,<br/>bulls and calves, length of dry period, total<br/>digestible nutrients or net energy for<br/>lactation and protein content in diets (dry<br/>and lactation)</li> </ul>   |  | n/a - no default value   
  | n/a - no default value   
  |  
  | No No  
   | No No No   | n/a n/a n/a   | n/a<br>Environmental LCA: none<br>BMPs: none   
  | Image: series (1)       Im  |
|  | Energy use Fuel type used for ma<br>number of operations<br>spraying, spreading, h<br>Primary processing Oxygen demand in wa<br>containing organic con<br>Water No  | s for tillage,<br>larversting<br>aste water No   | - Swine: yearly birth rate, pre-weaning<br>death loss<br>- Sheep - market lamb: number of rams,<br>lambing rate, number of lambs per birth<br>No<br>No   | n/a - no default value<br>n/a - no default value<br>n/a - no default value   | n/a - no default value<br>n/a - no default value<br>n/a - no default value   
  | n/a - no default value<br>n/a - no default value<br>n/a - no default value   
  |  
  | No No I  
   | No No No Irrigation application effic - Irrigation: total N in irrigation water  | n/a     n/a       n/a     n/a       Datasets for flow and water quality data     n/a  | Environmental LCA: none<br>BMPs: none<br>n/a<br>Environmental LCA: water for watering and washing<br>BMPs: none  
  | Image: Section of the section of th   |
|  | Transport     No       Default values are<br>recent (less than 10     Yes       Use of drop-down<br>menus with options     Yes       Clear identification     Yes       Definitions or<br>explanatory<br>information<br>available     Yes   | No       Yes - for the majority       Yes       Yes       Yes       Yes  | No       Yes (to be validate because the latest data documented are from the Holos 1.1.       Yes       Yes       Yes  | n/a - no default value<br>n/a - no default value<br>Yes<br>Yes<br>Yes  | n/a - no default value       n/a - no default value       Yes       Yes       Yes       Yes  
  | n/a - no default value       n/a - no default value       Yes       Yes       Yes       Yes  
  |  
  | Yes Y<br>Yes Y<br>Yes Y  
   | No No<br>Yes Yes<br>Yes Yes<br>Yes Yes<br>Yes Yes  | n/a     n/a       Yes     n/a       Yes     Yes       Yes     Yes       Yes     Yes       Yes     Yes       Yes     Yes   | Environmental LCA: average distance to the milk processing<br>installation<br>Environmental LCA: yes<br>BMPs: n/a<br>Environmental LCA: yes for a few entries only<br>BMPs: tick boxes for all questions (mostly yes/no questions)<br>Environmental LCA: yes<br>Environmental LCA: yes<br>BMPs: yes  
  | Implementation       Imple  |
| the data required and  | a farm manager<br>would typically have  | ta is<br>halyses<br>dif<br>is are not<br>nuire specific<br>to fill.<br>be easily<br>decumentation, quick to fill - Qualitati<br>decumentation, quick to fill - Qualitati<br>data entries can be easily completed b   | documentation and time consuming - Qualitative<br>data entries can be easily completed by the user.<br>Data on crop areas and irrigation areas can be  | e documentation and time consuming -<br>. Qualitative data entries can be easily<br>completed by the user. However, unless the   | documentation - Qualitative data entrie<br>can be easily completed by the user. Da<br>on crop areas and drainage areas can b   
  | fill - all information can<br>be filled quickly and  
  | n specific s   
  | Difficult, require a lot of Specific documentation, time t   
   | but other will require<br>some research. There specific documentation, fairly of<br>fill - Qualitative data entries ca<br>easily completed by the user.  | and related to agricultural questions, it will take a lot of time.  | all the documentation, fairly quick to fill - Qualitative data entries can be  
  | display.display.display.line display.line display. <th< td=""></th<>  |
| Units and format   | data on soil organic matter,<br>pH can be hardly fordund. Qu-<br>related to fertilizers and per<br>require the user to search th<br>documents, but these docu<br>be accessible. General dess:<br>use changes can be easily pr<br>producer, but not the speci-<br>the tree species and densitili<br>entries related to livestock a<br>producer to fill. Data on ene<br>(electricity and fuel) are usu<br>accessible to producers.  | moisture and<br>antitative data<br>sticidas will<br>hrough its<br>ments should<br>ription on land<br>fic details on<br>es; Any da<br>are easy for<br>regy use  | easing estimated by the producer. Quantitative<br>data related to fertilizers and pesticides will<br>require the user to search through its documents<br>which should be accessible, but the user can also   | producer has obraiter, molisture and pH can be<br>soll arganic matter, molisture and pH can be<br>s hardly found. Data on crop areas and<br>irrigation areas can be easily estimated by t<br>producer.Quantitative data related to<br>d fertilizers and pesticides will require the us<br>to search through its documents, but these<br>k documents should be accessible. Data on<br>energy use (electricity and fuel) are usually<br>easily accessible to producers.  | <ul> <li>easily estimated by the producer;</li> <li>Quantitative data related to fertilizers i</li> <li>pesticides will require the user to searc</li> <li>through its documents, but these</li> <li>documents should be accessible. Data e</li> <li>easily accessible to producers, except fi swathers fuel use or power (in which cz</li> </ul>  
  | and<br>ch<br>ually<br>for<br>rase,   
  | entries can be easily<br>completed by the user.<br>Data on energy use<br>(electricity and fuel)<br>are usually easily<br>accessible to<br>producers.   
  | f<br>a<br>c<br>No<br>Y   
   | filled by the producer<br>and it will thus be time<br>consuming.<br>documents, but these documents<br>should be accessible. Data on e<br>use feletricity and fuel) are us  | n soll as geographical information and completed by the user.<br>climate data are already climate   | but these documents should be accessible. Data on energy use<br>(electricity and fuel) are usually easily accessible to producers.<br>BMPs assessment: There are a lot of questions to answers, but the user<br>can decide to focus on only one category of BMPs. Qualitative<br>information is easy to provide.<br>Yes  
  | average knowledge of water quality issues<br>could use. data might be discouraging and<br>time consuming. findings. The report was not<br>intended for producers' use. findings. The report was not<br>intended for producers' use. findings. The report was not<br>intended for producers' use. findings. The report was not intended for producers'<br>use. for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not intended for producers'<br>intended for producers' use. findings. The report was not i   |
| Outputs<br>Results   | Broad presentation<br>of results (final<br>values only)<br>Detailed summary<br>of results in tables   | No<br>Yes  | No<br>Yes  | No<br>Yes  | No<br>Yes - tables are presented in a deta   
  | Yes - only one value (kg<br>CO2e per tonne of crop<br>ailed No   
  |  
  | "<br>F<br>E<br>V   
   | No No<br>Yes - reports of daily Yes - metric dashboard<br>"year to date" soil<br>moisture conditions,<br>evapotranspiration (crop<br>water use), climate data,<br>irrigation application   | incorporated data with calibration<br>and validation. Users are not<br>required to supply data further for<br>the tool."<br>No No   | No<br>Yes  
  | Image: series of the stables are available in the report of downloaded.       Series are available in the report of downl   |
|  | Detailed summary Yes<br>of results in graphs  | Yes  | Yes  | Yes - spidergram and line graphs   | Yes - graphs (bar and pie charts) ar<br>presented in a detailed report   
  | re No  
  | Yes Y  
  | Yes Y  
   | Yes - reports of daily<br>Yes - reports of daily<br>"year to date" soil<br>moisture conditions,<br>evapotranspiration (crop<br>water use), climate data,   | Yes - charts and maps Yes - spidergram and bar graph  | Yes  
  | Ves - graphs can be viewed online       Ves - graphs are available in the report       Ves - graphs and maps are available       Ves - graphs and maps are available  |
| Analysis/interpretati<br>on of results   | Summary of main Yes<br>hotspots   | No   | No   | No   | Yes  
  | No   
  | Yes N  
  | ii<br>a<br>a<br>a  
   | n/a No   | Yes - "The tool can identify hot<br>spots (prioritizing landscapes<br>based on cost effectiveness criteria<br>(rediment and nutrient reductions   | Yes  
  | Image: Section is an analysis section       Yes - the report contains an analysis section.       Yes - the report contains an analysis se   |
|  | Comparison with<br>alternative<br>scenarios<br>Others No  | Yes  | Yes (but not directly as a separate report<br>will need to be created for the alternative<br>scenario explored)<br>No  | Yes - comparison with averages   | Yes - comparison with averages<br>A full report is provided with<br>background information on the  
  | No   
  | Yes Y<br>No No   
  | c  
   | n/a No Predictive assessment No on crop water  | (sediment and nutrient reductions<br>per \$1,000) and conduct statistics<br>analysis such as min, max,<br>average."         Yes         Yes         "an optimal set of BMPs with<br>locations and types within the  | No, but comparison with provincial and national averages<br>Action plan with BMPs to be implemented  
  |   |
| Areas of BMPs cover  | 1   |  |  |  | indicators assessed.   
  |  
  |  
  | i<br>c<br>-<br>c<br>f<br>f<br>f<br>f<br>f<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t<br>t  
   | requirements and<br>irrigation timing for<br>designated near-future<br>time periods<br>- Record keeping for<br>crop production<br>information such as<br>fertilizer and chemical<br>use, seeding rate, crop<br>yields, pumps and<br>pumping record<br>information, irrigation<br>application and rainfall  | watershed to achieve the<br>environmental target with<br>minimized BMP cost" or with a<br>specified budget constraint.  |  
  |   |
| Livestock yards<br>Soil management<br>Nutrient<br>management<br>Manure use and<br>management<br>Livestock wintering<br>sites<br>Pest management<br>Water bodies<br>Trees, Shelterbelts,<br>Woodlots, Bush<br>Agricultural Waste  | a Yes<br>Yes<br>Yes   | Yes<br>Yes<br>Yes<br>Yes   | Yes<br>Yes<br>Yes  | Yes<br>Yes   | Yes<br>Yes<br>Yes<br>Yes   
  |  
  | Y  
  | Yes<br>Yes<br>Yes  
   | Yes<br>Yes   | Yes     Yes   | Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes  
  | And<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>AAnd<br>A  |
| Management<br>Others<br>Limitations<br>Limits of the<br>model/tool   |   | rmentation Enteric fermentation, energy use<br>input data As the tool is focused on GHG emission<br>related to feed, options to modify farr<br>conditions are limited  | - Cannot compare in one single<br>report/table/graph GHG emissions of  | in GHG emissions indicator (due to the<br>complexity and uncertainty related to<br>this topic)   | <ul> <li>nitrous oxide emissions from the<br/>residues of peas and lentils as the<br/>model assumes that fixed nitrogen</li> </ul>   
  | included in the model<br>and the results are only<br>n in based on the location o<br>the farm. Cannot be<br>s specific to a particular   
  | hatchery stage was k<br>based on literature A<br>of studies or datasets fi<br>describing European d<br>operations not fi   
  | Only applicable to farms for<br>located in the US a<br>Assumptions: One-directional v<br>flow; no ditches, guilies, or v<br>direct conveyance; edge-of-<br>field only (not through adjacent r  
   | a past year, but the<br>weather can be highly<br>variable between years.   | study watersheds. The models can<br>be developed for different sets of<br>BMPs and then interface/tool can<br>be further developed for users."<br>The tool was fully developed for a<br>specific study watershed in Ontario<br>for now. Not all BMPs related to<br>water quality and quantity that<br>could be relevant to other<br>d as watershed across Canada are  | <ul> <li>Average emissions for crop production for cow feed may not be<br/>plate representative as there is high variability in the production,<br/>/SAFA management and fertilization</li> </ul>  
  |   |
| Relevance for Alberta<br>Applicable to the<br>Alberta context  | The tool is used by lar<br>companies relevant to<br>Alberta market that m   |  |  | Reporting using the Fieldprint metrics<br>may potentially be requested of Albert<br>wheat and potato producers by large<br>processor and retailer partners.  | ta participants to the initiative represe<br>a wide range of producers in the  
  | as Yes - specific to Prairies  
  | Alberta context o<br>Use of economic a<br>allocation for co-<br>products n<br>LCIA methodology I<br>IMPACT 2002+ does<br>not characterize the<br>wide array of emissions<br>s Yes - adapted N<br>specifically to the ir  
  | Not directly applicable, but Y<br>includes a wide range of crops t<br>that are relevant to Alberta s   
   | Yes - features specific to<br>the irrigation district potentially request prod   | s tool is expanded to other definitions and frameworks with of  | beginning to get relevant information specific to the regional context)  
  | requirements with the amount of fertilizer       However, these are largely not available         nitrogen sold and manure produced in any       at a national         given polygon (Huffman et al., 2008; Yang       scale;         et al., 2011)."       Feliable when the field-tested  |
| Covers at least one<br>commodity<br>prioritized by AAF<br>Is relevant to one of<br>the markets   | Yes   | (Pelletier, 2015)<br>Yes<br>Yes - It is developed to have internatic   | Yes<br>al Yes  | Yes<br>Yes   | Yes  
  | Yes  
  | Yes Y<br>Yes Y   
  | Yes Y<br>Yes Y   
   | for US farmers)<br>Yes Yes<br>Yes Yes  | tool could be used more widely by       Alberta farmers and conservation<br>managers with BMPs more<br>relevant to the regional context.       n/a       Yes  | No<br>Yes  
  | Image from no-till () to reduced tillage () and conventional tillage       Image from no-till () to reduced tillage () and conventional tillage         Image from no-till () to reduced tillage () and conventional tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () and conventional tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage         Image from no-till () to reduced tillage       Image from no-till () to reduced tillage <t< td=""></t<>   |
| Is referred to in a<br>standard, program or<br>initiative listed in<br>Phase 2 (i.e. the use<br>of the tool is<br>requested or<br>recommended)   | Requirements (curren<br>development):<br>http://www.goldstand<br>es/default/files/docur<br>methodology<br>_draft_for_public_cor<br>pdf  | ture<br>ttly in<br>dard.org/sit<br>ments/cft_<br>nment_v1.   | Yes - The Holos methodology is used in the<br>Canadian FieldPrint tool.  | No - but many publications, including from USDA, refer to the tool.  | Not yet released.  
  | No   
  | n<br>b<br>v  
  | No - but some publications N<br>refer to the tool. The tool is<br>based on USDA and WRI earlier<br>work and received funding<br>from USDA.   
   | No Yes - Metrics are cross-<br>compliant with a subset<br>The Sustainability<br>Consortium's Key<br>Performance Indicators   | of developed by FAO.  | s, No - but in Quebec, the Dairy Farmers association requests all farmers<br>to fill the BMP questionnaire to collect information on the industry.<br>Also, Quebec dairy farmers can fill a specific section of the tool to<br>check their compliance with the PAA certification program (proAction).<br>Once farmers have completed this part of the tool, an action plan is<br>generated and farmers can use it to see what actions they need to put<br>in place to comply with PAA.   
  |   |
| Is widely recognized<br>(i.e. used by several<br>companies or<br>organizations)  |   | Agriculture<br>tainable<br>peseed)<br>Srowers The tool is gaining recognition in anim<br>illever, feed sector (Pelletier, 2014).   | It is administered by AAFC, which is a<br>recognized authority. It mentioned in many<br>provincial governments documentations.   | companies in the USA. It is also   | Not yet released.  
  | Yes- the tool was<br>developed by AAFC and<br>Canola Council of<br>Canada which are both<br>recognized bodies.   
  | Alberta.   
  | t  
   | by AAF, a recognized large companies (Unilev<br>authority. Del Monte Foods),<br>environmental and publ<br>interest groups (The<br>Sustainability Consortiur<br>The Nature Conservancy  | m,  | Yes - it is administered by Dairy Farmers of Canada, a recognized body.  
  |   |
| functionality? (main t   | ocus on GHG and water quality benefits)<br>ly compare a scenario with the BMP in plac   | Yes<br>ty BMPs? If not, what are the gaps in data and<br>e and another scenario without the BMP to meas  | Yes<br>e   | Yes  | Yes  
  | No   
  | Yes Y  
  | Yes N  
   | WWF), growers, supplie<br>trade associations (Natic<br>Potato Council, Western<br>Growers), and experts<br>(Sustainable Food Lab,<br>University of Arkansas)   | onal<br>I   | Yes  
  |   |
|  | amount and/or for long term changes<br>intensity of tillage management (no-till,<br>till, conventional till) c<br>calculate the changes<br>term carbon stocks (i.   | the fuel   | information on their past and current tillage<br>system to calculate GHG emissions related<br>to soil and energy.<br>b) No - users can compare their results with<br>alternative scenarios, but to do so, they<br>need to create a new project and compare<br>the reports provided.  | <ul> <li>e data on tillage practices in order to<br/>calculate GHG emissions related to</li> <li>equipment energy use and soil erosion<br/>but not to soil organic matter due to th</li> <li>"uncertainties in the current scientific<br/>undestanding of the impacts of tillage</li> </ul>  | input data on past and current tilla,<br>practices and uses these inputs alo<br>with an algorithm from Holos to<br>calculate soil carbon loss, using<br>Canadian soil data.<br>b) Yes - users can compare scenario<br>directly in the tool.  
  | age b) n/a<br>ong  
  | b) n/a ti<br>ti<br>la<br>b<br>b<br>a   
  | a) Yes - the tool requires users at<br>to provide information on the<br>lillage practices to account for<br>nitrogen and phosphorus<br>losses.<br>b) Yes - users can compare a<br>baseline scenario with an<br>alternative scenario directly in<br>the tool.   
   |  | the benefits of conservation tillage<br>on watersheds.<br>b) Yes - the tool allows users to<br>compare multiple alternative<br>scenarios and identify the best<br>scenario.   | y need b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.   
  | k calculate GHG emissions from soil carbon<br>maagement (i.e. useful for IPCC Tier 2 or<br>Tier 3 approaches)<br>k t v e conservation tillage<br>t v a loculate GHG emissions from soil carbon<br>maagement (i.e. useful for IPCC Tier 2 or<br>Tier 3 approaches)<br>k t v e conservation tillage<br>perform calculation on GHG<br>perform calculation on |
| perennial or pulse   | crop rotation a) No<br>incorporating b) n/a   | a) No - due to the lack of data, the too   | b) No - users can compare their results with<br>alternative scenarios, but to do so, they<br>need to create a new project and compare  | generate new results.<br>a) Yes - the tool can model emissions<br>based on crop rotation.<br>b) No - users can compare their results<br>with alternative scenarios, but to do sc<br>they need to save the results of the ba  | a) Yes - the tool can model impacts<br>crop rotations based on the freque<br>of crop rotation and the type of cro<br>o, grown previously.<br>b) Yes - users can compare scenario   
  | ency b) n/a<br>op  
  | b) n/a t<br>n<br>d<br>a<br>b<br>b<br>a<br>a<br>a<br>a<br>a<br>a  
  | a) Yes - the tool requires users a<br>to provide information on crop to<br>rotation (planting and kill<br>dates) to account for nitrogen<br>and phosphorus losses.<br>b) Yes - users can compare a<br>baseline scenario with an<br>alternative scenario directly in<br>the tool.   
   |  | <ul> <li>b) n/a</li> <li>best practice in environmental integrity<br/>rotation practices are considered bene<br/>to land conservation, soil chemical qua<br/>GHG mitigation practices.</li> <li>b) No - users can compare their results<br/>alternative scenarios, but to do so, the</li> </ul>   | s with impacts on biodiversity, climate change, soil health and water quality.<br>y need b) No - users can compare their results with alternative scenarios, but<br>to do so, they need to create a new project and compare the reports<br>s can<br>ir   
  | Image: series of the start   |
|  | chemical forms best emissions related to for application based on t   |  | <ul> <li>related to fertilizer application based on the N and P fertilization rates (already defined in the tool or adapted by users).</li> <li>b) in the tool or adapted by users).</li> <li>b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare</li> </ul>   | <ul> <li>emissions related to fertilizer applications are a shready defined in the tool. Specific the fertilizer formulations cannot be modelled.</li> <li>b) No - users can compare their results with alternative scenarios, but to do so they need to save the results of the base scenario and then change the inputs to scenario and then change the input scenario and the scenario and th</li></ul>   | on related to fertilizer application bass<br>on the fertilization rates (N, P, K, S,<br>and micronutrients) defined by use<br>b) Yes - users can compare scenario<br>directly in the tool.  | ed b) n/a<br>,<br>ers .  
   
  | b) n/a e<br>a<br>o<br>n<br>a<br>P<br>b<br>b<br>b   
  | a) Partially - the tool can model at<br>emissions related to fertilizer<br>application based on fertilizers<br>already defined in the tool. The<br>only parameters that can be<br>modified are the the amount<br>applied as well as NO3-N, PO4-<br>P, org-N and org-P fractions.<br>b) Yes - users can compare a<br>baseline scenario with an<br>alternative scenario directhy in  
   | b) n/a b) n/a  | <ul> <li>a) Yes - the tool should be able to<br/>model the benefits related to<br/>nutrient management. Currently,<br/>the tool was only tested for a<br/>specific case study and was able to<br/>assess the impacts of fertilization<br/>application source (on<br/>watersheds).</li> <li>b) Yes - the tool includes optimized fert<br/>application rates as a best practice in<br/>environmental integrity. Optimized fert<br/>air pollution prevention.</li> <li>No - users can compare their results<br/>alternative scenarios, but to do so, the<br/>to create a new project and compare<br/>provides a rating to practices that users<br/>pick from. Users can thus compare their<br/>pick from. Users can thus compare their<br/>pick from. Users can thus compare their</li> </ul>  | tilizer<br>a) Yes - the tool requires users to provide information on their fertilizer<br>application rates in order to assess their current practices according to<br>identified BMPs and benchmark themselves with other producers in<br>Canada and in the province. Fertilizer application practices are related<br>to impacts on climate change, soil health and water quality.<br>b) No - users can compare their results with alternative scenarios, but<br>to do so, they need to create a new project and compare the reports<br>s can<br>ir   
  | Implementation of the BMP.       Implementation of the BMP. <td< td=""></td<>   |
| based on testing and   |   |  |  | scenario and then change the inputs to generate new results.   | a) Partially - the tool can model<br>n emissions related to manure   
  |  
  | a) No a  
  |  
   |  | compare multiple alternative scenarios and identify the best scenario.       pick from. Users can thus compare their current practices with BMPs presented tool.         a) Yes - the tool should be able to model the benefits related to the manure application rate. Currently, the tool was only tested for a specific case study and was able to assess the impacts of nutrient management on run-off (to       a) No  | ir<br>Iin the  
  | s       Partially - specific climatic data can be used<br>s       No       Partially - data on nitrogen and<br>phosphorus present in watershed can be<br>unific nit calculate GHG emissions from fertilizer<br>application (i.e. useful) for IPCC Tier 2 or Tier<br>s       No       Partially - data on nitrogen and<br>phosphorus present in watershed can be<br>unific nitrogen and<br>phosphorus present in w  |
| method -<br>conventionally tilled  | rate is based on<br>manure nutrient<br>content determined<br>NPK content of defaul  | e a) Yes - the tool can model emissions<br>nanure related to manure application based o<br>J on the N content of manure (already defined<br>It manure the tool or adapted by users).<br>re. b) Yes - users can compare their result<br>ipare their with alternative scenarios.   | <ul> <li>the related to manure application based on the N content of manure (already defined in the tool or adapted by users).</li> <li>b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare</li> </ul>   | <ul> <li>related to manure application based of<br/>e the N content of manure (already<br/>defined in the tool or adapted by users<br/>b) No - users can compare their results<br/>with alternative scenarios, but to do sc</li> </ul>   | <ul> <li>manure (e.g.dairy, poultry, hog and<br/>beef) that is already defined in the<br/>tool. Specific manure content cann<br/>be modelled.</li> </ul>   
  | d<br>not   
  | a<br>n<br>ir<br>p<br>n<br>a<br>p   
  | parameters that can be<br>modified are the amount<br>applied as well as NO3-N, PO4-<br>P, org-N and org-P fractions.<br>b) Ves - users can compare a   
   |  | watershed).<br>b) Yes - the tool allows users to<br>compare multiple alternative  | povided.   
  | on water quality.       "efficiency of N use by estimating the amount of N remaining in the top 60 cm of N remaining i  |
|  | rate is based on<br>manure nutrient<br>content determined<br>by manure analysis<br>based on "book<br>value" manure<br>nutrient content<br>manure is injected<br>or incorporated<br>immediately after<br>application<br>application<br>application<br>or user-defined manu<br>(preferred), or is<br>b) Yes - users can com<br>based on "book<br>scenarios.<br>a) Partially - the tool r<br>users to provide data<br>manure application<br>(preferred), or<br>broadcast and<br>incorporated soon<br>afterwards<br>b) Yes - users can com<br>b) Application<br>calculations are not by<br>yes - users can com<br>b) Application<br>calculations are not by<br>yes - users can com<br>pagination<br>calculations are not by<br>yes - users can com<br>pagination<br>component<br>calculations are not by<br>yes - users can com   | re       a) Yes - the tool can model emissions         nanure       related to manure application based of         of on the       N content of manure (already defined         th manure       the tool or adapted by users).         pare their       b) Yes - users can compare their result         with alternative scenarios.       with alternative scenarios.         re       a) Partially - the tool accounts for the         manure application method, but does       differenciate between conventionally         and and other types of land.       b) Yes - users can compare their result         with alternative scenarios.       with alternative scenarios.  | the related to manure application based on the N content of manure (already defined in the tool or adapted by users).         b) No users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.         a) No         b) No user         b) No         b) Na   | <ul> <li>related to manure application based or<br/>e the N content of manure (already<br/>defined in the tool or adapted by users</li> <li>b) No - users can compare their results<br/>with alternative scenarios, but to do sc<br/>they need to save the results of the ba<br/>scenario and then change the inputs to</li> </ul>   | <ul> <li>manure (e.g.dairy, poultry, hog and<br/>beef) that is already defined in the<br/>o, tool. Specific manure content cann<br/>be modelled.</li> <li>b) Yes - users can compare scenario<br/>directly in the tool.</li> <li>a) Yes - the tool requires data input<br/>related to manure application meth<br/>to measure GHG emissions (i.e.<br/>nitrous oxides emissions according<br/>p) IPCC Tier 2 methodology). Howeves<br/>the impacts of the manure applicat<br/>methods on water quality is not<br/>calculated.</li> </ul>   
  | d<br>enot<br>os<br>a) No<br>thod b) n/a<br>gto<br>er,<br>tion  
  | a) No a  
  | modified are the amount applied as well as NO3-N, PO4-   
   | a) No a) No<br>b) n/a b) n/a   | <ul> <li>b) Yes - the tool allows users to<br/>compare multiple alternative<br/>scenarios and identify the best<br/>scenario.</li> <li>a) Yes - the tool should be able to<br/>model the benefits related to the<br/>method of manure application.<br/>Currently, the tool was only tested<br/>for a specific case study and was<br/>able to assess the impacts of<br/>nutrient management on run-off<br/>(on watershesd).</li> <li>b) Yes - the tool includes the use of<br/>mission manure and slurry applica<br/>environmental integrity. This pract<br/>orsidered beneficial to air pollutio<br/>prevention.</li> </ul>   | <ul> <li>Flow- a) Yes - the tool requires users to provide information on their manure application method in order to assess their current practices according to identified BMPs and benchmark themselves with other producers in Canada and in the province. Impacts related to the method of manure ice is application are soil health and water quality.</li> <li>b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.</li> </ul>   
  | abb   |
| application for plant  | rate is based on<br>manure nutrient<br>content determined<br>by manure analysis<br>(preferred), or is<br>based on "book<br>value" manure<br>nutrient content<br>or incorporated<br>immediately after<br>application<br>application<br>by Ves - users can com<br>results with alternativ<br>scenarios.<br>a) Partially - the tool r<br>users to provide data<br>manure application<br>or due - defined<br>anure<br>scenarios.<br>a) Partially - the tool r<br>users to provide data<br>manure application<br>or deferred), or<br>broadcast and<br>cilcorporated soon<br>tilcorporated soon<br>tillage practices.   | re       a) Yes - the tool can model emissions         nanure       related to manure application based of         of on the       N content of manure (already defined         th manure       the tool or adapted by users).         pare their       b) Yes - users can compare their result         with alternative scenarios.       with alternative scenarios.         re       a) Partially - the tool accounts for the         manure application method, but does       differenciate between conventionally         and and other types of land.       b) Yes - users can compare their result         with alternative scenarios.       with alternative scenarios.  | the related to manure application based on the N content of manure (already defined in the tool or adapted by users).<br>b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.<br>a) No b) n/a | <ul> <li>a) Yes - the tool requires users to specific the manure application based or the results of the tool or adapted by users</li> <li>b) No - users can compare their results with alternative scenarios, but to do so they need to save the results of the bas scenario and then change the inputs to generate new results.</li> <li>a) Yes - the tool requires users to specific the manure application method in ordition to calculate nitrous oxide emissions.</li> <li>b) No - users can compare their results of the bas scenario and then change the inputs to generate new results.</li> </ul>  | <ul> <li>a) Manure (e.g.dairy, poultry, hog and<br/>beef) that is already defined in the<br/>b, tool. Specific manure content cann<br/>be modelled.</li> <li>b) Yes - users can compare scenario<br/>directly in the tool.</li> <li>if a) Yes - the tool requires data input<br/>related to manure application metit<br/>to measure GHG emissions (i.e.<br/>initrous oxides emissions according<br/>p) IPCC Tier 2 methodology). Howeve<br/>the impacts of the manure applicat<br/>or calculated.</li> <li>b) Yes - users can compare scenario<br/>directly in the tool.</li> </ul>   | d<br>not<br>os<br>a) No<br>b) n/a<br>cos<br>a) No<br>b) n/a<br>a) No<br>b) n/a<br>b) n/a   
   
  | a) No a<br>b) n/a b<br>b) n/a t<br>b) n/a b  
  | modified are the amount<br>applied as well as NO3-N, PO4-<br>P, org-N and org-P fractions.<br>b) Yes - users can compare a<br>baseline scenario with an<br>alternative scenario directly in<br>the tool.   
   | b) n/a b) n/a<br>a) No a) No<br>b) n/a b) n/a  | b) Yes - the tool allows users to compare multiple alternative scenarios and identify the best scenario.       a) Yes - the tool should be able to model the benefits related to the method of manure application.       a) Yes - the tool includes the use of emission manure and slurry application.         Currently, the tool was only tested for a specific case study and was able to assess the impacts of compare multiple alternative scenarios and identify the best scenario.       a) Yes - the tool allows users to compare multiple alternative scenarios.         a) Yes - the tool should be able to model the benefits related to the timing of manure application.       b) No - users can compare their current prawith BMPs presented in the tool.         a) Yes - the tool should be able to model the benefits related to the timing of manure application.       a) Partially - the tool includes imprimental integrity. This practice in environmental integrity. This practic  | flow-<br>application method in order to assess their current practices according<br>to identified BMPs and benchmark themselves with other producers in<br>Canada and in the province. Impacts related to the method of manure<br>application are soil health and water quality.         b) No - users can compare their results with alternative scenarios, but<br>to do so, they need to create a new project and compare the reports<br>provided.         oved       a) Yes - the tool requires users to provide information on the timing of<br>manure application in order to assess their current practices according<br>ing) to identified BMPs and benchmark themselves with other producers in<br>Canada and in the province. The good timing of manure application   
  | Image: Section of the section of th   |
| application for plant<br>needs<br>27 - Restoration of  | rate is based on<br>manure nutrient<br>content determined<br>by manure analysis<br>based on "book<br>value" manure<br>nutrient content<br>or incorporated<br>immediately after<br>application<br>presults with alternativ<br>scenarios.   | re       a) Yes - the tool can model emissions         nanure       related to manure application based of         of on the       N content of manure (already defined         th manure       the tool or adapted by users).         pare their       b) Yes - users can compare their result         with alternative scenarios.       with alternative scenarios.         re       a) Partially - the tool accounts for the         manure application method, but does       differenciate between conventionally         and and other types of land.       b) Yes - users can compare their result         with alternative scenarios.       with alternative scenarios.  | the related to manure application based on the N content of manure (already defined in the tool or adapted by users).<br>b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.<br>a) No b) n/a | <ul> <li>a) Partially - the tool can model the impact of the times of application in the transition in the terms of application in the terms of application in the terms of application and the change the inputs to generate new results.</li> <li>a) Yes - the tool requires users to specify the manure application method in ordition to calculate nitrous oxide emissions.</li> <li>b) No - users can compare their results of the bas scenario and then change the inputs to generate new results.</li> </ul>  | <ul> <li>a) Manure (e.g. dairy, poultry, hog and<br/>beef) that is already defined in the<br/>tool. Specific manure content cann<br/>be modelled.</li> <li>b) Yes - users can compare scenario<br/>directly in the tool.</li> <li>ify a) Yes - the tool requires data input<br/>related to manure application meth<br/>to measure GHG emissions (i.e.<br/>nitrous oxides emissions according<br/>p. IPCC Tier 2 methodology). Howeve<br/>se the impacts of the manure application<br/>methods on water quality is not<br/>calculated.</li> <li>b) Yes - users can compare scenario<br/>directly in the tool.</li> </ul>   | d<br>not<br>os<br>a) No<br>b) n/a<br>ct<br>a) No<br>b) n/a<br>ct<br>b) n/a<br>ct<br>b) n/a<br>ct<br>ct<br>b) n/a<br>ct<br>ct<br>ct<br>ct<br>ct<br>ct<br>ct<br>ct<br>ct<br>ct  | a) No a<br>b) n/a b<br>a) No a<br>b) n/a t<br>a) No a<br>b) n/a t<br>b) n/a   | modified are the amount<br>applied as well as NO3-N, PO4-<br>P, org-N and org-P fractions.<br>b) Yes - users can compare a<br>baseline scenario with an<br>alternative scenario directly in<br>the tool.<br>a) No a<br>b) n/a t<br>a) Yes - the tool requires users<br>b) n/a t<br>b) n/a t<br>corpovide data on the date of<br>manure application in order to<br>measure related emissions.<br>b) Yes - users can compare a<br>baseline scenario with an  | a) No<br>b) n/a<br>b) n/a<br>a) No<br>b) n/a<br>b) n/a<br>b) n/a<br>b) n/a<br>b) n/a<br>b) n/a<br>b) n/a<br>b) n/a<br>b) n/a   | b) Yes - the tool allows users to compare multiple alternative scenarios and identify the best scenario.       a) Yes - the tool should be able to model the benefits related to the method of manure application. Currently, the tool was only tested for a specific case study and was able to assess the impacts of nutrient management on run-off (on watershesd).       a) Yes - the tool allows users to compare multiple alternative scenarios and identify the best scenario.       b) Yes - the tool allows users to compare the reports provided. Ho the tool already provides a rating the practices that users can pick from. can thus compare their current prawith BMPs presented in the tool.         a) Yes - the tool should be able to model the benefits related to the timing of manure application. Currently, the tool was only tested for a specific case study and was able to assess the impacts of nutrient management on run-off (on watersheds).       b) Yes - the tool allows users to compare multiple alternative scenarios and identify the best scenario.       a) Partially - the tool includes imprimentation timing (of manure application. Currently, the tool was only tested for a specific case study and was able to assess the impacts of nutrient management on run-off (on watersheds).       b) Yes - the tool allows users to compare multiple alternative scenarios, but to do they need to create a new project is considere the reports provided. Ho tool already provides a rating the related to the restoration of wetland. Currently, the tool should be able to model the benefits related to the restoration of wetland. Currently, the tool should be able to model the benefits related to the restoration of wetland. Currently, the tool was only tested for a specific case study       a) No  | flow-<br>application method in order to assess their current practices according<br>to identified BMPs and benchmark themselves with other producers in<br>canada and in the province. Impacts related to the method of manure<br>application are soil health and water quality.         b) No - users can compare their results with alternative scenarios, but<br>to do so, they need to create a new project and compare the reports<br>provided.         o       o         users<br>strices       a) Yes - the tool requires users to provide information on the timing of<br>manure application in order to assess their current practices according<br>to identified BMPs and benchmark themselves with other producers in<br>Canada and in the province. The good timing of manure application<br>can have potential benefits on soil health and water quality.         b) No - users can compare their results with alternative scenarios, but<br>to do so, they need to create a new project and compare the reports<br>provided.         oved       a) Yes - the tool requires users to provide information on the timing of<br>manure application in order to assess their current practices according<br>to identified BMPs and benchmark themselves exit other producers in<br>Canada and in the province. The good timing of manure application<br>can have potential benefits on soil health and water quality.         b) No - users can compare their results with alternative scenarios, but<br>to do so, they need to create a new project and compare the reports<br>provided.         o       Users<br>strices   | Image: Section of the secting of the secting of th   |
| application for plant<br>needs<br>27 - Restoration of<br>wetlands<br>28 - Use of buffer  | rate is based on<br>manure nutrient<br>content determined<br>by manure analysis<br>based on "book<br>user-defined manu<br>(preferred), or is<br>based on "book<br>autrient content<br>application rate based<br>by Yes - users can com<br>results with alternativ<br>scenarios.<br>a) Partially - the tool r<br>users to provide data<br>manure application m<br>order to calculate GHU<br>(preferred), or<br>broadcast and<br>incorporated soon<br>afterwards<br>manure is applied in<br>the spring, just prior<br>to or during active<br>plant growth<br>buffer zones are<br>established and<br>maintained<br>buffer zones are<br>established and<br>maintained<br>between field crops  | re       a) Yes - the tool can model emissions         nanure       related to manure application based of         of on the       N content of manure (already defined         th manure       the tool or adapted by users).         pare their       b) Yes - users can compare their result         with alternative scenarios.       with alternative scenarios.         re       a) Partially - the tool accounts for the         manure application method, but does       differenciate between conventionally         and and other types of land.       b) Yes - users can compare their result         with alternative scenarios.       with alternative scenarios.  | the related to manure application based on the N content of manure (already defined in the tool or adapted by users).         b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.         a) No         b) No - however the previous version of the tool was able to model the benefits of spreading manure in the spring.         b) n/a         a) No         b) n/a         a) No - however the previous version of the tool was able to model the benefits of spreading manure in the spring.         b) n/a         a) No         b) n/a         a) No indext the tool can model the impact of inleal tree pointings and shelterbelts, but of user storage, not water quality, soil erosion or riparian health.   | <ul> <li>related to manure application based of e the N content of manure (a)ready defined in the tool or adapted by users b) No - users can compare their results with alternative scenarios, but to do sc they need to save the results of the ba scenario and then change the inputs to generate new results.</li> <li>a) Yes - the tool requires users to speci the manure application method in ord to calculate nitrous oxide emissions. b) No - users can compare their results with alternative scenarios, but to do sc they need to save the results of the ba scenario and then change the inputs to generate new results.</li> <li>a) Yes - the tool can model the impact of the timing of application in terms of pre/post-planting and/or pre/post-harvesting. b) No - users can compare their results with alternative scenarios, but to do sc they need to save the results of the ba scenario and then change the inputs to generate new results.</li> <li>a) Partially - the tool can model the impact of the timing of application in terms of pre/post-planting and/or pre/post-harvesting. b) No - users can compare their results with alternative scenarios, but to do sc they need to save the results of the ba scenario and then change the inputs to generate new results.</li> <li>a) No b) n/a</li> <li>a) No</li> <li>b) n/a</li> </ul>   | <ul> <li>a) No - the tool does not model impacts related to the timing of application of manure application of manure application methods on water quality is not calculated.</li> <li>b) Yes - users can compare scenario directly in the tool.</li> </ul>   | d<br>hot<br>os<br>a) No<br>b) n/a<br>g to<br>c,r,<br>tion<br>os<br>a) No<br>b) n/a<br>d<br>b) n/a<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r,<br>c,r  | a) No a b) n/a a b) n/a a b) n/a b) n  | a) Yes - the tool requires users       a         a) No       b) n/a         b) Yes - the tool requires users       a         a) No       b) n/a         b) Yes - the tool requires users       a         a) No       b) n/a       a         b) Yes - the tool requires users       a         a) No       b) n/a       b         a) No       b) n/a       b         b) n/a       b       c         a) Yes - the tool requires users       a         b) n/a       c       c         a) No       b) n/a       c         b) n/a       c       c         a) Yes - the tool requires users       a         b) n/a       c       c         a) Yes - the tool requires users       a         b) n/a       c       c         a) No - the tool requires users       a         b) n/a       c       c         a) No - the tool requires inputs       a         a) No - the tool requires inputs       a         b) n/a       c       c         a) Yes - the tool can model the       a         a) Yes - the tool can model the       a         b) n/a       c       c   | b) n/a b) n/a<br>a) No b) n/a a) No b) n/a<br>a) No b) n/a a) b) n/a a) No b) n/a a) n/a a) No b) n/a a) A) No b) n/a a) n n a) No b) n/a a) n n a) No b) n/a a) n n a) n n a) n n a) n n a) n a) | b) Yes - the tool allows users to compare multiple alternative scenario.       a) Yes - the tool should be able to model the benefits related to the method of manure application. 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| application for plant<br>needs<br>27 - Restoration of<br>wetlands<br>28 - Use of buffer<br>zones for field crops   | rate is based on<br>manure nutrient<br>content determined<br>by manure analysis<br>incerpred), or is<br>based on "book<br>value" manure<br>nutrient contentemissions related to m<br>application rate based<br>or user-defined manu<br>or user-defined manu<br>p) Yes - users can com<br>results with alternativ<br>scenarios.manure is injected<br>or incorporated<br>immediately after<br>application<br>(preferred), or<br>broadcast and<br>incorporated sconal<br>afterwardsa) Partially - the tool r<br>users to provide data<br>manure application<br>order to calculate GHG<br>(preferred), or<br>broadcast and<br>incorporated sconal<br>afterwardsa) No<br>b) Yes - users can com<br>results with alternativ<br>scenarios.manure is applied in<br>the spring, just prior<br>to or during active<br>plant growtha) No<br>b) n/abuffer zones are<br>established and<br>maintained<br>between field crops<br>and riparian areasa) No<br>b) n/acover crops planted<br>for erosiona) Partially - 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   | modified are the amount         applied as well as NO3-N, PO4-         p, org-N and org-P fractions.         p) Yes - users can compare a         baseline scenario with an         alternative scenario directly in         the tool.         a) No         b) n/a         a) Yes - the tool requires users         to provide data on the date of         measure related emissions.         b) Yes - users can compare a         baseline scenario with an         alternative scenario directly in         the tool.  
  | b) n/a     b) n/a       a) No     b) n/a       a) No     b) n/a       b) n/a     a) No       b) n/a     b) n/a   | b) Yes - the tool allows users to compare multiple alternative scenarios and identify the best scenario.       a) Yes - the tool should be able to model the benefits related to the method of manure application. Currently, the tool was only tested for a specific case study and was able to assess the impacts of nutrient management on run-off (on watershesd).       a) Yes - the tool allows users to compare multiple alternative scenarios and identify the best scenario.       b) Yes - the tool allows users to compare their scelated to the model the benefits related to the tool already provides a rating tprovides rating tprovides a rating tprovides a rating tprovides a ratin  | Flow.       a) Yes - the tool requires users to provide information on their manure application method in order to assess their current practices according to identified BMPs and benchmark themselves with other producers in Canada and in the province. Impacts related to the method of manure application are soil health and water quality.         on       b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.         ore       a) Yes - the tool requires users to provide information on the timing of manure application in order to assess their current practices according to identified BMPs and benchmark themselves with other application in order to assess their current practices according to identified BMPs and benchmark themselves with other application in order to assess their current practices according to identified BMPs and benchmark themselves with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.         o       a) Yes - the tool requires users to provide information on the use of conservation practices such as buffer strips in order to assess their current practices according to identified BMPs and benchmark themselves with other province. The use of buffer strips can have potential benefits on biodiversity, climate shares on biodiversity, climate themselves with other provide.         a) No       b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports were, provided.         o       a) No b) N/a         b) No - users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports  
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users provide wetland drainage history information (i.e. acres drained).</li> <li>b) No - the calculator does not incluiding the tool.</li> <li>a) No - the calculator does not incluiding the tool.</li> <li>a) No - the calculator does not incluiding the tool in the totation to measure application of manure is application in terms of pre-seed, work is a seed and post-seeding.</li> <li>b) No - b) n/a</li> <li>a) No - the tool requires users to input data on the last perennial croin in the rotation to measure GHG emissions.</li> <li>b) No - b) n/a</li> <li>b) Yes - users can compare scenario directly in the tool.</li> </ul>  | a       a) No         os       b) n/a         gto       b) n/a         os       b) n/a  
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   | b) n/a       b) n/a         a) No       a) No         b) n/a       b) n/a         a) No       b) n/a         b) n/a       cross-comparison of the results with alternation of cove crops, but does not mod the related impacts.         b) n/a       b) No - users can comparison beir results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the results with alternation of cove crops, but does not mod the change the inputs to ger new results.         a) No       a) No       a) No  | a) Yes - the tool should be able to model the benefits related to the method of manure application. Currently, the tool was only tested for a specific case study and was able to assess the impacts of a compare multiple alternative scenarios.       a) Yes - the tool allows users to compare the utiple alternative scenarios, but to d the tool already provides a rating to practice that users can pick from. Can thus compare their current prawith BMPs presented in the tool.         a) Yes - the tool should be able to model the benefits related to the timing of manure application. Currently, the tool was only tested for a specific case study and was able to assess the impacts of nutrient management on run-off (on watershed).       a) Pres-the tool allows users to compare multiple alternative scenarios, but to d they need to create a new project. Compare the related to the timing of manure application.         a) Yes - the tool allows users to compare multiple alternative scenarios, but to d they need to create a new project. Compare the reports provided. How the tool already provides a rating to practice share users can pick from. Can thus compare their current prawith BMPs presented in the tool.         a) Potentially yes - the tool should be able to model the benefits related to the second from to assess these impacts on the watershed.       a) No         b) Yes - the tool should be able to may compare the reports provided. How the scenarios and identify the best scenario.       a) No         a) Potentially yes - the tool should be able to model the benefits related to the use of buffer scenarios.       a) No         b) Yes - the tool should be able to model the benefits related to the use of buffer scenario.       a) Yes - the tool should be able to model the benefits related to   | I ves       a) Ves       the tool requires users to provide information on their manure application method in order to assess their current practices according to identified BMPs and benchmark themselves with other producers in Canada and in the province. Impacts related to the method of manure application are soil health and water quality.         b) No users can compare their results with alternative scenarios, but to do so, they need to create a new project and compare the reports provided.         orded       a) Yes       the tool requires users to provide information on the timing of manure application in order to assess their current practices according to identified BMPs and benchmark themselves with other producers in Canada and in the province. The good timing of manure application den the reports provided.         oved       a) Yes       the tool requires users to provide information on the user of canada and in the province. The good timing of manure application den to create a new project and compare the reports provided.         users       b) No users can compare their results with alternative scenarios, but to so, they need to create a new project and compare the reports provided.         add       a) No       b) n/a         b) n/a       b) n/a         conservation practices such as buffer strips in order to assess their current practices according to identified BMPs and benchmark thereative scenarios, but and on the provide.         users       b) No users can compare their results with alternative scenarios, but and on the provide.         users       b) No users can compare their results with alternative scenarios, but to dos o   
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