# *ISO 19131 Annual Crop Inventory – Data Product Specifications*

Revision: A

# Data product specifications: Annual Crop Inventory

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# Data product specifications: Annual Crop Inventory

## 1. Overview

### 1.1. Informal description

Each season the Earth Observation Team of Agriculture and Agri-Food Canada (AAFC) maps crop types of individual fields in Canada. They developed an operational software system to decipher crop types using satellite observations and trustworthy ground information. Successful crop identification relies on image acquisitions from multiple sensors during key crop phenological stages (reproduction, seed development and senescence).

Multi-temporal optical data (Sentinel-2, Landsat-8/9) are the primary data source for crop classification because the NIR/SWIR channels are vital to crop classifications. Over a growing season, a minimum of three optical images are required to successfully identify crops. To the optical data, c-band radar data (30m Compact-Pol RCM data) is added to help with physical plant structures and moisture measurements.

Annual crop insurance data are the most accurate, detailed and complete sources of information for crop types in Canada. As such, AAFC has agreements with some provincial crop insurance agencies to use their data for the training and validation of the classification process. For provinces where insurance data cannot be accessed, ground-truth information is provided by point observations from AAFC staff or other provincial sources. Each year, AAFC staff and their supporters collect tens of thousands of points identifying crops across the country. These point sources are combined and used as training and reference data as well.

The training and validation data used to classify non-agricultural land cover types comes from numerous Land Cover / Land Use products, including the AAFC semi-decadal land use time series. Point data are taken from these products and adjusted (eliminating any that were in transitions areas between classes or in areas of high potential change (i.e. near urban expansion)). What remains is a stable series of known land cover points for the following classes: water, barren, urban, shrubland, wetland, grassland, agriculture (generalized), and forest.

Focusing on the Prairie Provinces in 2009 and 2010, a Decision Tree (DT) based methodology was applied using optical (Landsat-5, AWiFS, DMC) and radar (RADARSAT-2) imagery. The final map had a spatial resolution of 56m.

For the 2011 and 2012 growing season, this activity was extended to all the other provinces (except Newfoundland) in support of a national crop inventory. The final spatial resolution was increased to 30m, to aid in differentiating the smaller fields in the rest of Canada. For 2012, the lack of affordable optical data forced AAFC to rely mostly on RADARSAT-2 data.

In 2013, this activity expanded to include Newfoundland for the first time, and move to Landsat-8 as its sole-source of optical imagery. RADARSAT-2 continued to be the source of radar imagery. This combination of optical and radar imagery had been repeated over the agricultural extent of Canada in the subsequent years, until 2016 when Sentinel-2 and Gaofen-1 optical imagery were added. The Gaofen imagery was dropped after the 2017 season. For the 2021 map, the RADARSAT Constellation Mission (RCM) satellites became the source of radar imagery. In 2022, Landsat-9 imagery was added to the optical collection.

At present, this approach can consistently deliver a crop inventory that meets the overall target accuracy of at least 85% at a final spatial resolution of 30m.

Note: At the national scale, the crop type legend is not necessarily homogeneous. In some provinces, we may have been able to divide the crop types in to sub-categories (i.e. winter versus spring wheat). For other provinces, those classes may not have been subdivided. A lack of training sites and, in some cases, a limited availability of spectral data, does not allow for the differentiation of crops into sub-categories with sufficient precision. This can result in class discontinuities between provinces.

## 1.2. Data product specification - metadata

This section provides metadata about the creation of this data product specification

| | |
|---|---|
| Data product specification – title: | Annual Crop Inventory |
| Data product specification - reference date: | 2009-present |
| Data product specification - responsible party: | Earth Observation Team of the Science and Technology Branch (STB) |
| Data product specification – language: | English |
| Data product specification - topic category: | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |

## 1.3. Terms and Definitions

- Feature attribute
  characteristic of a feature

- Class
  description of a set of objects that share the same attributes, operations, methods, relationships, and semantics [UML Semantics]
  NOTE: A class does not always have an associated geometry (e.g. the metadata class).

- Feature
  abstraction of real world phenomena

- Object
  entity with a well-defined boundary and identity that encapsulates state and behaviour [UML Semantics]
  NOTE: An object is an instance of a class.

- Package
  grouping of a set of classes, relationships, and even other packages with a view to organizing the model into more abstract structures

## 1.4. Abbreviations

| | |
|---|---|
| AAFC | Agriculture and Agri-Food Canada |
| AWiFS | Advanced Wide Field Sensor |
| DMC | Disaster Monitoring Constellation |
| DT | Decision-Tree Classifier |
| NIR/SWIR | Near Infrared/Short-Wavelength Infrared |
| RCM | RADARSAT Constellation Mission |
| SAR | Synthetic Aperture Radar |
| ScanSAR | Scanning Synthetic Aperture Radar |
| SPOT | Satellite Pour l'Observation de la Terre |
| STB | Science and Technology Branch |

# 2. SPECIFICATION SCOPE

This data specification has only one scope, the general scope.

NOTE: The term ‘specification scope’ originates from the International Standard ISO19131. ‘Specification scope’ does not express the purpose for the creation of a data specification or the potential use of data, but identifies partitions of the data specification where specific requirements apply.

# 3. DATA PRODUCT IDENTIFICATION

## 3.1. Data series identification

| | |
|---|---|
| Title | Annual Crop Inventory |
| Alternate Title | AAFC Crop Type Mapping |
| Abstract | Understanding the state and trends in agriculture production is essential to combat both short-term and long-term threats to stable and reliable access to food for all, and to ensure a profitable agricultural sector. The Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) developed an operational system to generate crop type digital maps of Canadian agriculture annually. A Decision Tree (DT) based methodology is applied using optical and radar based satellite images. Currently this approach uses imagery from Landsat-8, Landsat-9, Sentinel-2, and RCM satellites, and can consistently deliver a crop inventory that meets the overall target accuracy of at least 85% at a final spatial resolution of 30m. In the beginning in 2009 and 2010 they focused solely on the Prairie Provinces (maps with 56m resolution were created). With the 2011 growing season, this activity was extended to other provinces in support of a national crop inventory and the resolution improved to 30m. |
| Purpose | The crop inventory provides fundamental information on the state and changes in Canada's agricultural landscape, and its value is wide-ranging. For example, the 2011 inventory included the identification of acreages that had been too wet to seed earlier in the year. These estimates fell within 3% of figures provided independently by the Provinces. The inventory has also been used to validate the practices of Canadian canola producers who wish to access the European bio-fuel feedstock market, estimated to be worth $500 million annually. |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30m pixels (2011 – present)<br>56m pixels (2009, 2010) |
| Geographic Description | 2022 - Present – All Canadian Provinces, and Yukon Territory<br>2013 to 2021 – All Canadian Provinces<br>2011 & 2012 – All Canadian Provinces (except Newfoundland)<br>2009 & 2010 – Prairie Provinces |
| Supplemental Information | Data is provided in .TIF format and is subdivided at provincial boundaries.<br><br>Citation: Agriculture and Agri-Food Canada, 2024, "Annual Space-Based Crop Inventory for Canada, 2009-2024", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence: http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geographic data, Geography |
| Scope identification | series |

## 3.2. Data product identification

### 3.2.1. Annual Crop Inventory, 2009

| | |
|---|---|
| Title | Annual Crop Inventory, 2009 |
| Alternate Title | AAFC Crop Type Mapping in the Prairies 2009 |
| Abstract | In 2009 the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) began the process of generating annual crop inventory digital maps using satellite imagery. Focusing on the Prairie Provinces, a Decision Tree (DT) based methodology was applied using both optical (AWiFS, Landsat-5) and radar (RADARSAT-2) based satellite imagery, and having a final spatial resolution of 56m. Methods were also developed to enhance the optical classification with RADARSAT-2 imagery, addressing issues associated with cloud cover. In conjunction with satellite acquisitions, ground-truth information was provided by provincial crop insurance companies and point observations from our regional AAFC colleagues. The overall process for Crop Inventory Map includes: satellite data acquisition; field data acquisition for classification training and accuracy assessment; and, operational implementation of the classification methodology.<br>The initial methodology was developed in partnership with AAFC Research Branch, and supported in part by the Canadian Space Agency. The long-term objective of this endeavour is to expand from the Prairies and produce an annual crop inventory of the entire agricultural extent of Canada. |
| Purpose | Annual crop type mapping in the Prairies provinces |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 56m |
| Geographic Description | Prairie Provinces |
| Supplemental Information | The overall accuracy of this map for crop classes in the Prairies is: 80% Kappa: 0.73<br><br>Citation: Agriculture and Agri-Food Canada, 2009, “Annual Space-Based Crop Inventory for Canada, 2009”, Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence: http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, maps, Geographic data, Geography |
| Scope Identification | Dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.2. Annual Crop Inventory, 2010

| | |
|---|---|
| Title | Annual Crop Inventory, 2010 |
| Alternate Title | AAFC Crop Type Mapping in the Prairies, 2010 |
| Abstract | In 2010 the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) continued the process of generating annual crop inventory digital maps using |

| | |
|---|---|
| | satellite imagery. Focusing on the Prairie Provinces, a Decision Tree (DT) based methodology was applied using both optical (AWiFS, Landsat-5, DMC) and radar (RADARSAT-2) based satellite imagery, and having a final spatial resolution of 56m. Methods were also developed to enhance the optical classification with RADARSAT-2 imagery, addressing issues associated with cloud cover. In conjunction with satellite acquisitions, ground-truth information was provided by provincial crop insurance companies and point observations from our regional AAFC colleagues. The overall process for Crop Inventory Map includes: satellite data acquisition; field data acquisition for classification training and accuracy assessment; and, operational implementation of the classification methodology. |
| Purpose | Annual crop type mapping in the Prairies provinces |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 56 m |
| Geographic Description | Prairie Provinces |
| Supplemental Information | The overall accuracy of this map for crop classes in the Prairies is: 85.1% Kappa: 0.82<br><br>Citation: Agriculture and Agri-Food Canada, 2010, “Annual Space-Based Crop Inventory for Canada, 2010”, Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | Dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.3. Annual Crop Inventory, 2011

| | |
|---|---|
| Title | Annual Crop Inventory, 2011 |
| Alternate Title | AAFC Crop Type Mapping, 2011 |
| Abstract | In 2011, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) expanded the process of generating annual crop inventory digital maps using satellite imagery to include British Columbia, Ontario, Quebec, and the Maritime provinces, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-5, DMC) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by provincial crop insurance companies and point observations from our regional AAFC colleagues. |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada (except Newfoundland) |

| | |
|---|---|
| Supplemental Information | Overall accuracies for crop classes are:<br>Prince Edward Island: 67%<br>Nova Scotia: 71%<br>New Brunswick: 88%<br>Quebec: 81%<br>Ontario: 82%<br>Manitoba: 79%<br>Saskatchewan: 87%<br>Alberta: 88%<br>British Columbia: Not evaluated<br><br>Citation: Agriculture and Agri-Food Canada, 2011, "Annual Space-Based Crop Inventory for Canada, 2011", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | Dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.4. Annual Crop Inventory, 2012

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|---|---|
| Title | Annual Crop Inventory, 2012 |
| Alternate Title | AAFC Crop Type Mapping, 2012 |
| Abstract | In 2012, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada (except Newfoundland), in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (DMC, SPOT) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by provincial crop insurance companies and point observations from our regional AAFC colleagues |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada (except Newfoundland) |
| Supplemental Information | Overall accuracies for crop classes are:<br>Prince Edward Island: 79%<br>Nova Scotia: 90%<br>New Brunswick: 88%<br>Quebec: 82%<br>Ontario: 76%<br>Manitoba: 85%<br>Saskatchewan: 82%<br>Alberta: 88%<br>British Columbia: 73%<br><br>Citation: Agriculture and Agri-Food Canada, 2012, "Annual Space- |

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|---|---|
| | Based Crop Inventory for Canada, 2012", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | Dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.5. Annual Crop Inventory, 2013

| | |
|---|---|
| Title | Annual Crop Inventory, 2013 |
| Alternate Title | AAFC Crop Type Mapping, 2013 |
| Abstract | In 2013, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by provincial crop insurance companies and point observations from the BC Ministry of Agriculture and our regional AAFC colleagues |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall accuracies for crop classes are:<br>Newfoundland: 98.8% (mainly pasture)<br>Prince Edward Island: 86.6%<br>Nova Scotia: 76.1%<br>New Brunswick: 88.9%<br>Quebec: 85.8%<br>Ontario: 87.0%<br>Manitoba: 85.4%<br>Saskatchewan: 86.5%<br>Alberta: 89.9%<br>British Columbia: 79.2%<br><br>Citation: Agriculture and Agri-Food Canada, 2013, "Annual Space-Based Crop Inventory for Canada, 2013", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | Dataset |

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|---|---|
| Feature Attribute Names | Class(Value) |

### 3.2.6. Annual Crop Inventory, 2014

| | |
|---|---|
| Title | Annual Crop Inventory, 2014 |
| Alternate Title | AAFC Crop Type Mapping, 2014 |
| Abstract | In 2014, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by provincial crop insurance companies and point observations from the BC Ministry of Agriculture and our regional AAFC colleagues. |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall accuracies for crop classes are:<br>Newfoundland: Not evaluated<br>Prince Edward Island: 81.0%<br>Nova Scotia: 64.4%<br>New Brunswick: 89.1%<br>Quebec: 83.9%<br>Ontario: 87.9%<br>Manitoba: 90.3%<br>Saskatchewan: 85.9%<br>Alberta: 89.4%<br>British Columbia: 88.4%<br><br>Citation: Agriculture and Agri-Food Canada, 2014, “Annual Space-Based Crop Inventory for Canada, 2014”, Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | Dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.7. Annual Crop Inventory, 2015

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|---|---|
| Title | Annual Crop Inventory, 2015 |
| Alternate Title | AAFC Crop Type Mapping, 2015 |
| Abstract | In 2015, the Earth Observation Team of the Science and Technology |

| | |
|---|---|
| | Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by provincial crop insurance companies and point observations from the BC Ministry of Agriculture and our regional AAFC colleagues |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: Not evaluated<br>Prince Edward Island: 83.69%<br>Nova Scotia: 85.24%<br>New Brunswick: 86.05%<br>Quebec: 87.10%<br>Ontario: 89.63%<br>Manitoba: 90.01%<br>Saskatchewan: 89.65%<br>Alberta: 88.91%<br>British Columbia: Not evaluated<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 68.32%<br>Prince Edward Island: 75.67%<br>Nova Scotia: 66.07%<br>New Brunswick: 68.10%<br>Quebec: 72.76%<br>Ontario: 74.07%<br>Manitoba: 63.38%<br>Saskatchewan: 70.08%<br>Alberta: 66.90%<br>British Columbia: 74.40%<br><br>Citation: Agriculture and Agri-Food Canada, 2015, “Annual Space-Based Crop Inventory for Canada, 2015”, Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | Dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.8. Annual Crop Inventory, 2016

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|---|---|
| Title | Annual Crop Inventory, 2016 |
| Alternate Title | AAFC Crop Type Mapping, 2016 |
| Abstract | In 2016, the Earth Observation Team of the Science and Technology |

| | |
|---|---|
| | Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8, Sentinel-2, Gaofen-1) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the BC Ministry of Agriculture, & the Ontario Ministry of Agriculture, Food and Rural Affairs; and data collection supported by our regional AAFC Research and Development Centres in St. John's, Kentville, Charlottetown, Fredericton, Guelph, and Summerland |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 94.51%<br>Prince Edward Island: 82.44%<br>Nova Scotia: 90.59%<br>New Brunswick: 89.66%<br>Quebec: 91.17%<br>Ontario: 88.98%<br>Manitoba: 92.44%<br>Saskatchewan: 92.26%<br>Alberta: 90.84%<br>British Columbia: 86.27%<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 72.90%<br>Prince Edward Island: 77.12%<br>Nova Scotia: 70.15%<br>New Brunswick: 70.32%<br>Quebec: 73.02%<br>Ontario: 75.11%<br>Manitoba: 68.08%<br>Saskatchewan: 71.28%<br>Alberta: 68.77%<br>British Columbia: 76.20%<br><br>Citation: Agriculture and Agri-Food Canada, 2016, "Annual Space-Based Crop Inventory for Canada, 2016", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | Dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.9. Annual Crop Inventory, 2017

| | |
|---|---|
| Title | Annual Crop Inventory, 2017 |
| Alternate Title | AAFC Crop Type Mapping, 2017 |
| Abstract | In 2017, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8, Sentinel-2, Gaofen-1) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the BC Ministry of Agriculture, & the Ontario Ministry of Agriculture, Food and Rural Affairs; and data collection supported by our regional AAFC Research and Development Centres in St. John's, Kentville, Charlottetown, Fredericton, Guelph, and Summerland |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 91.83%<br>Prince Edward Island: 87.28%<br>Nova Scotia: 89.49%<br>New Brunswick: 81.78%<br>Quebec: 89.07%<br>Ontario: 84.70%<br>Manitoba: 93.10%<br>Saskatchewan: 91.28%<br>Alberta: 91.48%<br>British Columbia: 92.79%<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 72.16%<br>Prince Edward Island: 76.33%<br>Nova Scotia: 72.30%<br>New Brunswick: 69.48%<br>Quebec: 72.89%<br>Ontario: 75.88%<br>Manitoba: 70.29%<br>Saskatchewan: 72.20%<br>Alberta: 68.46%<br>British Columbia: 76.93%<br><br>Citation: Agriculture and Agri-Food Canada, 2017, "Annual Space-Based Crop Inventory for Canada, 2017", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - |

| | |
|---|---|
| | Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | Dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.10. Annual Crop Inventory, 2018

| | |
|---|---|
| Title | Annual Crop Inventory, 2018 |
| Alternate Title | AAFC Crop Type Mapping, 2018 |
| Abstract | In 2018, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8, Sentinel-2) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the BC Ministry of Agriculture, & the Ontario Ministry of Agriculture, Food and Rural Affairs; and data collection supported by our regional AAFC Research and Development Centres in St. John's, Kentville, Charlottetown, Fredericton, Guelph, and Summerland |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 93.84%<br>Prince Edward Island: 81.92%<br>Nova Scotia: 92.50%<br>New Brunswick: 88.83%<br>Quebec: 92.28%<br>Ontario: 91.99%<br>Manitoba: 94.61%<br>Saskatchewan: 91.65%<br>Alberta: 91.95%<br>British Columbia: 93.09%<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 74.67%<br>Prince Edward Island: 75.21%<br>Nova Scotia: 71.97%<br>New Brunswick: 70.99%<br>Quebec: 73.50%<br>Ontario: 76.02%<br>Manitoba: 70.50%<br>Saskatchewan: 72.79%<br>Alberta: 68.36%<br>British Columbia: 77.04%<br><br>Citation: Agriculture and Agri-Food Canada, 2018, "Annual Space-Based Crop Inventory for Canada, 2018", Agroclimate, Geomatics |

| | |
|---|---|
| | and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.11. Annual Crop Inventory, 2019

| | |
|---|---|
| Title | Annual Crop Inventory, 2019 |
| Alternate Title | AAFC Crop Type Mapping, 2019 |
| Abstract | In 2019, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8, Sentinel-2) and radar (RADARSAT-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the PEI Department of Environment, Water and Climate Change and data collection supported by our regional AAFC Research and Development Centres in St. John's, Kentville, Fredericton, and Guelph. |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 91.00%<br>Prince Edward Island: 89.78%<br>Nova Scotia: 89.10%<br>New Brunswick: 91.90%<br>Quebec: 91.80%<br>Ontario: 87.27%<br>Manitoba: 94.27%<br>Saskatchewan: 91.63%<br>Alberta: 91.29%<br>British Columbia: 89.35%<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 72.88%<br>Prince Edward Island: 77.77%<br>Nova Scotia: 69.71%<br>New Brunswick: 68.13%<br>Quebec: 72.94%<br>Ontario: 74.89%<br>Manitoba: 70.29% |

| | |
|---|---|
| | Saskatchewan: 71.39%<br>Alberta: 68.17%<br>British Columbia: 76.39%<br><br>Citation: Agriculture and Agri-Food Canada, 2019, "Annual Space-Based Crop Inventory for Canada, 2019", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.12. Annual Crop Inventory, 2020

| | |
|---|---|
| Title | Annual Crop Inventory, 2020 |
| Alternate Title | AAFC Crop Type Mapping, 2020 |
| Abstract | In 2020, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8, Sentinel-2) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the PEI Department of Environment, Water and Climate Change; the Ontario Ministry of Agriculture, Food and Rural Affairs; and data collection supported by our regional AAFC Research and Development Centres in St. John's, Fredericton, and Guelph. **Due to COVID-19 travel restrictions, complete sampling coverages in NL, NS, NB and BC were not possible, as a result the general agriculture class (120) is found in these provinces in areas where there was no ground data collected**. |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 95.08%<br>Prince Edward Island: 85.85%<br>Nova Scotia: N/A<br>New Brunswick: 95.74%<br>Quebec: 91.20%<br>Ontario: 88.26%<br>Manitoba: 93.58%<br>Saskatchewan: 93.87%<br>Alberta: 91.09%<br>British Columbia: 85.11% |

| | |
|---|---|
| | Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 75.09%<br>Prince Edward Island: 75.74%<br>Nova Scotia: 70.52%<br>New Brunswick: 68.57%<br>Quebec: 72.85%<br>Ontario: 75.84%<br>Manitoba: 68.97%<br>Saskatchewan: 69.93%<br>Alberta: 65.89%<br>British Columbia: 76.87%<br><br>Citation: Agriculture and Agri-Food Canada, 2020, "Annual Space-Based Crop Inventory for Canada, 2020", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.13. Annual Crop Inventory, 2021

| | |
|---|---|
| Title | Annual Crop Inventory, 2021 |
| Alternate Title | AAFC Crop Type Mapping, 2021 |
| Abstract | In 2021, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all of Canada, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8, Sentinel-2), and radar (RCM) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the PEI Department of Environment, Water and Climate Change; Ontario Ministry of Agriculture, Food and Rural Affairs; University of Guelph - Ridgetown campus; British Columbia Ministry of Agriculture; and data collection supported by our regional AAFC Research and Development Centres in St. John's, Kentville, Fredericton, Guelph and Summerland. **Due to COVID-19 travel restrictions and forest fires, complete sampling coverages in BC was not possible, as a result the general agriculture class (120) is found in this province in areas where there was no ground data collected**. |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |

| | |
|---|---|
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 91.59%<br>Prince Edward Island: 85.90%<br>Nova Scotia: 87.94%<br>New Brunswick: 87.49%<br>Quebec: 92.74%<br>Ontario: 87.53%<br>Manitoba: 92.38%<br>Saskatchewan: 92.27%<br>Alberta: 90.10%<br>British Columbia: 86.42% (Fraser Valley only)<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 73.99%<br>Prince Edward Island: 75.23%<br>Nova Scotia: 71.97%<br>New Brunswick: 70.44%<br>Quebec: 72.81%<br>Ontario: 75.66%<br>Manitoba: 67.51%<br>Saskatchewan: 71.28%<br>Alberta: 66.60%<br>British Columbia: 77.05%<br><br>Citation: Agriculture and Agri-Food Canada, 2021, "Annual Space-Based Crop Inventory for Canada, 2021", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.14. Annual Crop Inventory, 2022

| | |
|---|---|
| Title | Annual Crop Inventory, 2022 |
| Alternate Title | AAFC Crop Type Mapping, 2022 |
| Abstract | In 2022, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all Canadian provinces, in support of a national crop inventory. New this year, a map of the agricultural regions in the Yukon Territory was also produced. A Decision Tree (DT) based methodology was applied using optical (Landsat-8, Landsat-9, Sentinel-2), and radar (RCM) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the PEI Department of Environment, Water and Climate Change; Ontario Ministry of Agriculture, Food and Rural Affairs; University of Guelph - Ridgetown campus; British Columbia Ministry of Agriculture; and data collection supported by our regional AAFC Research and Development Centres in St. John's, |

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|---|---|
| | Kentville, Fredericton, Guelph, Summerland and Whitehorse. |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 92.61%<br>Prince Edward Island: 84.99%<br>Nova Scotia: 91.78%<br>New Brunswick: 91.83%<br>Quebec: 92.10%<br>Ontario: 84.34%<br>Manitoba: 92.34%<br>Saskatchewan: 93.01%<br>Alberta: 91.68%<br>British Columbia: 85.02%<br>Yukon: 91.02%<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 73.97%<br>Prince Edward Island: 74.30%<br>Nova Scotia: 72.55%<br>New Brunswick: 68.44%<br>Quebec: 68.84%<br>Ontario: 73.37%<br>Manitoba: 69.40%<br>Saskatchewan: 71.66%<br>Alberta: 66.69%<br>British Columbia: 77.66%<br>Yukon: 79.99%<br><br>Citation: Agriculture and Agri-Food Canada, 2022, “Annual Space-Based Crop Inventory for Canada, 2022”, Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.15. Annual Crop Inventory, 2023

| | |
|---|---|
| Title | Annual Crop Inventory, 2023 |
| Alternate Title | AAFC Crop Type Mapping, 2023 |
| Abstract | In 2023, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all Canadian provinces, in support of a national crop inventory. This year we again produced a map of the agricultural regions in the Yukon Territory. A Decision Tree (DT) based |

| | |
|---|---|
| | methodology was applied using optical (Landsat-8, Landsat-9, Sentinel-2), and radar (RCM) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the PEI Department of Environment, Water and Climate Change; and data collection supported by our regional AAFC Research and Development Centres in St. John's, Kentville, Fredericton, Guelph, Summerland and Whitehorse. New this season, Forest Fire Perimeter Estimate polygons from Natural Resources Canada's Canadian Forest Service were used to show burned areas of landcover. (Class - 60). |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 90.16%<br>Prince Edward Island: 81.84%<br>Nova Scotia: 88.51%<br>New Brunswick: 86.12%<br>Quebec: 90.19%<br>Ontario: 85.57%<br>Manitoba: 92.10%<br>Saskatchewan: 91.92%<br>Alberta: 88.53%<br>British Columbia: 85.50%<br>Yukon: 93.96%<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 72.43%<br>Prince Edward Island: 71.15%<br>Nova Scotia: 71.60%<br>New Brunswick: 70.27%<br>Quebec: 68.87%<br>Ontario: 73.38%<br>Manitoba: 68.47%<br>Saskatchewan: 71.00%<br>Alberta: 67.01%<br>British Columbia: 75.94%<br>Yukon: 79.80%<br><br>Citation: Agriculture and Agri-Food Canada, 2023, "Annual Space-Based Crop Inventory for Canada, 2023", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | dataset |
| Feature Attribute Names | Class(Value) |

### 3.2.16. Annual Crop Inventory, 2024

| | |
|---|---|
| Title | Annual Crop Inventory, 2024 |
| Alternate Title | AAFC Crop Type Mapping, 2024 |
| Abstract | In 2024, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) repeated the process of generating annual crop inventory digital maps using satellite imagery for all Canadian provinces and the Yukon Territory, in support of a national crop inventory. A Decision Tree (DT) based methodology was applied using optical (Landsat-8, Landsat-9, Sentinel-2), and radar (RCM) based satellite images, and having a final spatial resolution of 30m. In conjunction with satellite acquisitions, ground-truth information was provided by: provincial crop insurance companies in Alberta, Saskatchewan, Manitoba, & Quebec; point observations from the PEI Department of Environment, Water and Climate Change; and data collection supported by our regional AAFC Research and Development Centres in St. John's, Kentville, Fredericton, Guelph, Summerland and Whitehorse. Forest Fire Perimeter Estimate polygons from Natural Resources Canada's Canadian Forest Service are used to show burned areas of landcover (Class - 60). |
| Purpose | An annual national crop type map |
| Topic Category | Farming; Environment; GeoscientificInformation; imagery; BaseMaps; EarthCover; |
| Spatial Representation Type | grid |
| Spatial Resolution | 30 m |
| Geographic Description | Canada |
| Supplemental Information | Overall provincial accuracies for crop classes are:<br>Newfoundland: 96.69%<br>Prince Edward Island: 87.14%<br>Nova Scotia: 91.24%<br>New Brunswick: 87.71%<br>Quebec: 91.51%<br>Ontario: 87.44%<br>Manitoba: 93.00%<br>Saskatchewan: 94.44%<br>Alberta: 91.32%<br>British Columbia: 88.34%<br>Yukon: 98.83%<br><br>Overall provincial accuracies for non-agriculture land cover are:<br>Newfoundland: 77.71%<br>Prince Edward Island: 72.11%<br>Nova Scotia: 68.99%<br>New Brunswick: 68.44%<br>Quebec: 68.93%<br>Ontario: 72.26%<br>Manitoba: 69.70%<br>Saskatchewan: 71.53%<br>Alberta: 64.82%<br>British Columbia: 77.10%<br>Yukon: 80.00%<br><br>Citation: Agriculture and Agri-Food Canada, 2024, "Annual Space-Based Crop Inventory for Canada, 2024", Agroclimate, Geomatics and Earth Observation Division, Science and Technology Branch. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9 |
| Constraints | Data are subject to the Government of Canada Open Data Licence : |

| | |
|---|---|
| | http://open.canada.ca |
| Keywords | Government of Canada Core Subject Thesaurus (2000-02-01) - Remote Sensing, Satellites, Agriculture, Crops, Crop insurance, Farmlands, Forage crops, Land cover, Geomatics, Geographic Information Systems, Geographic data, maps, Geography |
| Scope Identification | dataset |
| Feature Attribute Names | Class(Value) |

# 4. DATA CONTENT AND STRUCTURE

Not Applicable

## 4.1. Feature-based application schema

Not Applicable

## 4.2. Feature catalogue – AAFC Crop Type Feature Catalog

| | |
|---|---|
| Title | AAFC Crop Type Feature Catalog |
| Scope | series |
| Version Number | 1 |
| Version Date | July 31, 2025 |
| Producer | Agriculture and Agri-food Canada |

System-generated attributes (for example, OBJECTID, Shape, Shape Length and Area) are not defined in the feature catalog.

### 4.2.1. Feature attributes

#### 4.2.1.1. Class(Value)

| Name | Class(Value) | | | |
|---|---|---|---|---|
| Definition | | | | |
| Aliases | | | | |
| Producer | AAFC | | | |
| Value Data Type | integer | | | |
| Value Domain Type | 1 (enumerated) | | | |
| Value Domain | | | | |
| Pulses | 160 | | | |
| | Label | Code | RGB | Definition |
| | Cloud | 10 | 0,0,0 | Areas unclassified due to cloud, shadow or other image quality factors. |
| | Water | 20 | 51,51,255 | Water bodies (lakes, reservoirs, rivers, streams, salt water, etc). |
| | Exposed Land / Barren | 30 | 153,102,102 | Land that is predominately non-vegetated and non-developed. Includes: glacier, rock, sediments, burned areas, rubble, mines, other naturally occurring non-vegetated surfaces. Excludes fallow agriculture |
| | Urban / Developed | 34 | 204,102,153 | Land that is predominantly built-up or developed and vegetation associated with these land covers. This includes road surfaces, railway surfaces, buildings and paved surfaces, urban areas, industrial sites, mine structures, golf courses, etc. |
| | Greenhouses | 35 | 225,225,225 | Greenhouses have been visually identified from satellite imagery |
| | Shrubland | 50 | 255,255,0 | Predominantly woody vegetation of relatively low height (generally +/-2 meters). May include grass or wetlands with woody vegetation, regenerating forest. |
| | Forest Fire / Burnt Area | 60 | 102, 102, 102 | Land that has experienced fire this season. Areas determined by the Forest Fire Perimeter Estimate |

| | | | | |
|---|---|---|---|---|
| | | | | polygons distributed by the Canadian Forest Service. |
| | Wetland | 80 | 153,51,153 | Land with a water table near/at/above soil surface for enough time to promote wetland or aquatic processes (semi-permanent or permanent wetland vegetation, including fens, bogs, swamps, sloughs, marshes etc). |
| | Peatland | 85 | 80,27,80 | Wetlands that are commercially harvested for peat. |
| | Grassland | 110 | 204,204,0 | Predominantly native grasses and other herbaceous vegetation, may include some shrubland cover. |
| | Agriculture (undifferentiated) | 120 | 204,102,0 | Agricultural land, including annual and perennial crops; and would exclude grassland. This class is mapped only if the distinction of sub-agricultural covers (classes 121-199) is not possible. |
| | Cropland | 121 | 254, 152, 50 | Annually cultivated land. This class is mapped only if the distinction of sub-agricultural covers (classes 122-199) is not possible. |
| | Pasture / Forages | 122 | 255,204,51 | Periodically cultivated. Includes tame grasses and other perennial crops such as alfalfa and clover grown alone or as mixtures for hay, pasture or seed. |
| | Too Wet to be Seeded | 130 | 120,153,246 | Agricultural fields that are normally seeded that remain unseeded due to excess spring moisture. |
| | Fallow | 131 | 255,153,0 | Plowed and harrowed fields that are left unsown for the growing season. |
| | Cereals | 132 | 102,0,0 | This class is mapped only if the distinction of sub-cereal covers (classes 133-146) is not possible. |
| | Barley | 133 | 218,227,29 | |
| | Other Grains | 134 | 153,204,0 | |
| | Millet | 135 | 210,219,37 | |
| | Oats | 136 | 209,213,43 | |

| | | | | |
|---|---|---|---|---|
| | Rye | 137 | 202,206,50 | |
| | Spelt | 138 | 195,198,58 | |
| | Triticale | 139 | 185,188,68 | |
| | Wheat | 140 | 167,179,77 | This sub-cereal class is mapped only if the distinction of sub-wheat covers (classes 145-146) is not possible. |
| | Switchgrass | 141 | 185,198,78 | |
| | Sorghum | 142 | 153,153,0 | |
| | Quinoa | 143 | 233,226,177 | |
| | Winter Wheat | 145 | 128,151,105 | |
| | Spring Wheat | 146 | 146,165,91 | |
| | Corn | 147 | 255,255,153 | |
| | Tobacco | 148 | 152,136,124 | |
| | Ginseng | 149 | 121,155,147 | |
| | Oilseeds | 150 | 94,162,99 | This class is mapped only if the distinction of sub-oilseed covers (classes 151-158) is not possible. |
| | Borage | 151 | 82,174,119 | |
| | Camelina | 152 | 65,191,122 | |
| | Canola / Rapeseed | 153 | 214,255,112 | |
| | Flaxseed | 154 | 140,140,255 | |
| | Mustard | 155 | 214,204,0 | |
| | Safflower | 156 | 255,127,0 | |
| | Sunflower | 157 | 49,84,145 | |
| | Soybeans | 158 | 204,153,51 | |
| | Other Oilseeds | 159 | 94, 162, 150 | |
| | Pulses | 160 | 137, 110, 67 | This class is mapped only if the distinction of sub-pulse covers (classes 161-174) is not possible. |
| | Other Pulses | 161 | 153,102,51 | |
| | Peas | 162 | 143,108,61 | |
| | Chickpeas | 163 | 182,164,114 | |
| | Beans | 167 | 130,101,74 | |
| | Fababeans | 168 | 163,144,105 | |
| | Lentils | 174 | 184,89,0 | |
| | Vegetables | 175 | 183,75,21 | This class is mapped only if the distinction of sub-vegetable covers (classes 176-179) is not possible. |
| | Tomatoes | 176 | 255,138,138 | |
| | Potatoes | 177 | 255,204,204 | |

| | | | | |
|---|---|---|---|---|
| | Sugarbeets | 178 | 111,85,202 | |
| | Other Vegetables | 179 | 255,204,255 | |
| | Fruits | 180 | 220,84,36 | This class is mapped only if the distinction of sub-fruit covers (classes 181-190) is not possible. |
| | Berries | 181 | 208,90,48 | This sub-fruit class is mapped only if the distinction of sub-berry covers (classes 182-185) is not possible. |
| | Blueberry | 182 | 210,0,0 | |
| | Cranberry | 183 | 204,0,0 | |
| | Other Berries | 185 | 220,50,0 | |
| | Orchards | 188 | 255,102,102 | |
| | Other Fruits | 189 | 197,69,59 | |
| | Vineyards | 190 | 116,66,189 | |
| | Hops | 191 | 255,204,153 | |
| | Sod | 192 | 181,251,5 | |
| | Herbs | 193 | 204,255,5 | |
| | Nursery | 194 | 7,249,140 | |
| | Buckwheat | 195 | 0,255,204 | |
| | Canaryseed | 196 | 204,51,204 | |
| | Hemp | 197 | 142,118,114 | |
| | Vetch | 198 | 177,149,79 | |
| | Other Crops | 199 | 116,154,102 | |
| | Forest (undifferentiated) | 200 | 0,153,0 | Predominantly forested or treed areas. This class is mapped only if the distinction of sub-forest covers (classes 210-230) is not possible. |
| | Coniferous | 210 | 0,102,0 | Predominantly coniferous forests or treed areas |
| | Broadleaf | 220 | 0,204,0 | Predominantly broadleaf/deciduous forests or treed areas. |
| | Mixedwood | 230 | 204,153,0 | Forest that is a combination of both the coniferous and broadleaf classes |

# 5. REFERENCE SYSTEMS

## 5.1. Spatial reference system

Name: WGS 84 / Agriculture Canada Albers
Code: ESPG:10820

Proj4:

+proj=aea +lat_0=40 +lon_0=-96 +lat_1=44.75 +lat_2=55.75 +x_0=0 +y_0=0 +datum=WGS84 +units=m +no_defs +type=crs

OGC WKT:

```
PROJCS["WGS 84 / Agriculture Canada Albers",
  GEOGCS["WGS 84",
    DATUM["WGS_1984",
    SPHEROID["WGS 84",6378137,298.257223563,
      AUTHORITY["EPSG","7030"]],
      AUTHORITY["EPSG","6326"]],
    PRIMEM["Greenwich",0,
      AUTHORITY["EPSG","8901"]],
    UNIT["degree",0.0174532925199433,
       AUTHORITY["EPSG","9122"]],
       AUTHORITY["EPSG","4326"]],
  PROJECTION["Albers_Conic_Equal_Area"],
  PARAMETER["latitude_of_center",40],
  PARAMETER["longitude_of_center",-96],
  PARAMETER["standard_parallel_1",44.75],
  PARAMETER["standard_parallel_2",55.75],
  PARAMETER["false_easting",0],
  PARAMETER["false_northing",0],
  UNIT["metre",1,
      AUTHORITY["EPSG","9001"]],
  AXIS["Easting",EAST],
  AXIS["Northing",NORTH],
     AUTHORITY["EPSG","10820"]]
```

ESRI WKT:

```
PROJCS["WGS_84_Agriculture_Canada_Albers",
  GEOGCS["GCS_WGS_1984",
    DATUM["D_WGS_1984",
    SPHEROID["WGS_1984",6378137.0,298.257223563]],
    PRIMEM["Greenwich",0.0],
    UNIT["Degree",0.0174532925199433]],
  PROJECTION["Albers"],
  PARAMETER["False_Easting",0.0],
  PARAMETER["False_Northing",0.0],
  PARAMETER["Central_Meridian",-96.0],
  PARAMETER["Standard_Parallel_1",44.75],
  PARAMETER["Standard_Parallel_2",55.75],
  PARAMETER["Latitude_Of_Origin",40.0],
```

**UNIT**["Meter",1.0]]

NOTE: Because of these projection parameters, maps that include areas above of 60°N will experience greater distortion than normal.

### 5.2. Temporal reference system

Gregorian calendar

## 6. DATA QUALITY

### 6.1. Completeness

### 6.2. Logical consistency

### 6.3. Positional accuracy

### 6.4. Temporal accuracy

To date this approach can consistently deliver a crop inventory that meets the overall target accuracy of at least 85% at a final spatial resolution of 30m (56m in 2009 and 2010). Individual provincial accuracies for each dataset can be found within section 3.2

### 6.5. Lineage statement

| | |
|---|---|
| Lineage Statement | Data Series: Over a single growing season, optical and radar images are collected in conjunction with ground data provided by a combination of AAFC personnel, provincial experts, contractors, and provincial crop insurance companies. All this data is run through a Decision Tree (DT) algorithm, whose crop map output has an image-based segmentation applied, before a final accuracy assessment is calculated. |
| Scope | |

# 7. DATA CAPTURE

To create the digital crop inventory, the Earth Observation Team applies a Decision Tree (DT) methodology to optical and radar satellite images that were acquired over a single growing season. The DT algorithm uses the known crop types of certain locations on the ground (gathered by AAFC employees; the BC Ministry of Agriculture; Ontario Ministry of Agriculture, Food and Rural Affairs; PEI Department of Environment, Water and Climate Change; University of Guelph - Ridgetown campus; private contractors; or provided by provincial crop insurance companies) to spectrally differentiate each of the crop types being mapped. These relationships are then applied to the satellite image data to identify the most likely crop type of each field in the study area. An iterative mode filter is then performed to clean up any speckling within the classification, before a final accuracy is assessed.

Over 4000 satellite images, each linked to hundreds of thousands of ground data points, are required to map Canada's entire agricultural extent annually and validate the resulting product. Hundreds of hours of computer processing time are required to do all the calculations to produce a final high-quality classification.

So far, AAFC can consistently deliver a crop inventory that meets the overall target accuracy of at least 85%. The annual crop inventory maps have already been applied by AAFC, the provinces, researchers and others to address many needs for the sector. AAFC freely shares the crop inventory data, and welcomes feedback from any of our users. For crop specific accuracies please contact: Leander.Campbell@agr.gc.ca

We acknowledge the following contributors:

Agricultural Financial Services Corporation, http://www.afsc.ca

BC Ministry of Agriculture, http://www.gov.bc.ca/agri/

Canadian Forest Service, https://natural-resources.canada.ca/our-natural-resources/forests-forestry/the-canadian-forest-service

Canadian Space Agency, http://www.asc-csa.gc.ca

Ducks Unlimited Canada, http://www.ducks.ca/

Earth Resources Observation & Science (EROS) Center, of the U.S. Geological Survey, http://eros.usgs.gov

La Financière agricole du Québec, http://www.fadq.qc.ca

Manitoba Agricultural Services Corporation, www.masc.mb.ca

Ontario Ministry of Agriculture, Food & Rural Affairs, http://www.omafra.gov.on.ca/

PEI Department of Environment, Water and Climate Change, https://www.princeedwardisland.ca/en/topic/environment-water-and-climate-change

Saskatchewan Crop Insurance Corporation, http://www.saskcropinsurance.com

Statistics Canada, http://www.statcan.gc.ca

## 8. DATA MAINTENANCE

Data Series: Updated annually

Individual Datasets: Not Planned.

## 9. PORTRAYAL

Not applicable.

## 10. DATA PRODUCT DELIVERY

TIF

format name: Tag Interleaved File:

version: 6.0

specification: GeoTIFF is format extension for storing georeference and geocoding information in a TIFF 6.0 compliant raster file by tying a raster image to a known model space or map projection.

languages: eng

character set: utf8

## 11. METADATA

The metadata requirements follow the Government of Canada's Treasury Board Standard on Geospatial Data (ISO 19115).