

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

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Revision: A

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## Data product specifications: AAFC Annual Crop Inventory

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# Data product specifications: AAFC Annual Crop Inventory

## 1. Overview

### 1.1. Informal description

Agriculture and Agri-Food Canada (AAFC) has been moving towards the development of an operational software system for mapping the crop types of individual fields using satellite observations. Successful crop identification relies on image acquisitions from multiple sensors during key crop phenological stages (reproduction, seed development and senescence).

Multi-temporal optical data are the primary data source for crop classification because the NIR/SWIR channels are vital to crop classification. Over a growing season, at least three optical images are required to successfully identify crops. To the optical data, dual-polarization RADARSAT-2 data is added. In 2009 and 2010 the ScanSAR mode, with its large swath (300 km) and moderate resolution (50 m), was used as it fits the agricultural landscape of the Prairie Provinces. From 2011-present, the finer resolution of the Wide mode (30 m) is used as it is better suited to narrower fields.

Annual crop insurance data are the most accurate, detailed and complete sources of information for crop types in Canada. As such, AAFC cooperates with provincial crop insurance agencies to use their data for the training and validation of satellite data analysis. 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 collects tens of thousands of points identifying crops across the country. Both these point sources are combined and used as training or reference sites.

In addition, the AAFC Land Cover for Agricultural Regions of Canada, circa 2000 map is used to define the agricultural extent under each annual crop inventory. This map is updated to the current year through an automated process.

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 used 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 was again used over the entire agricultural extent of Canada for 2014.

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 homogeneous. In some provinces, such as Alberta, Saskatchewan and Quebec, we have been able to divide the cereal crops in to sub-categories (Barley, Oats, Wheat, etc.). For other provinces, the cereals class may not have been subdivided. The lack of training sites and, in some cases, the limited availability of spectral data does not allow for the differentiation of cereals into sub-categories with sufficient precision. This results 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:	AAFC 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; imageryBaseMapsEarthCover;

## 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
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	AAFC Annual Crop Inventory
Alternate Title	AAFC Crop Type Mapping
Abstract	<p>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. Starting 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 type digital maps. 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) based satellite images. Beginning with the 2011 growing season, this activity has been extended to other provinces in support of a national crop inventory. 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).</p>
Purpose	<p>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.</p>
Topic Category	Farming; Environment; GeoscientificInformation; imageryBaseMapsEarthCover;
Spatial Representation Type	grid
Spatial Resolution	56m pixels (2009, 2010) 30m pixels (2011 – present)
Geographic Description	2009 – Prairie Provinces 2010 – Prairie Provinces

	<p>2011 – All of Canada (except Newfoundland)</p> <p>2012 – All of Canada (except Newfoundland)</p> <p>2013 – All of Canada</p> <p>2014 – All of Canada</p>
Supplemental Information	Data is provided in .TIF format and is subdivided in to both UTM zones (2009-2013), and provincial boundaries (2009-2014).
Constraints	Data are subject to the Government of Canada Open Data Licence: <a href="http://open.canada.ca">http://open.canada.ca</a>
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. AAFC Crop Inventory, 2009

Title	AAFC Crop Inventory, 2009
Alternate Title	AAFC Crop Type Mapping in the Prairies 2009
Abstract	<p>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.</p>



	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 (Alberta, Saskatchewan, & Manitoba)
Topic Category	Farming; Environment; GeoscientificInformation; imageryBaseMapsEarthCover
Spatial Representation Type	grid
Spatial Resolution	56m pixels
Geographic Description	Prairie Provinces
Supplemental Information	The overall accuracy of this map for crop classes in the Prairies is: 80% Kappa: 0.73  Data is provided in .TIF format and is subdivided in to both UTM zones, and provincial boundaries.
Constraints	Data are subject to the Government of Canada Open Data Licence: <a href="http://open.canada.ca">http://open.canada.ca</a>
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	dataset
Feature Attribute Names	Class(Value)

### 3.2.2. AAFC Crop Inventory, 2010

Title	AAFC 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 (Alberta, Saskatchewan, & Manitoba)
Topic Category	Farming; Environment; GeoscientificInformation; imageryBaseMapsEarthCover;
Spatial Representation Type	grid
Spatial Resolution	56m pixels
Geographic Description	Prairie Provinces
Supplemental Information	The overall accuracy of this map for crop classes in the Prairies is: 85.1% Kappa: 0.82  Data is provided in .TIF format and is subdivided in to both UTM zones, and provincial boundaries.
Constraints	Data are subject to the Government of Canada Open Data Licence : <a href="http://open.canada.ca">http://open.canada.ca</a>
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	dataset
Feature Attribute Names	Class(Value)

### 3.2.3. AAFC Crop Inventory, 2011

Title	AAFC 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; imageryBaseMapsEarthCover;
Spatial Representation Type	grid
Spatial Resolution	30 m pixels
Geographic Description	All of Canada (except Newfoundland)
Supplemental Information	<p>Overall accuracies for crop classes are:</p> <p>Prince Edward Island: 67%</p> <p>Nova Scotia: 71%</p> <p>New Brunswick: 88%</p> <p>Quebec: 81%</p> <p>Ontario: 82%</p> <p>Manitoba: 79%</p> <p>Saskatchewan: 87%</p> <p>Alberta: 88%</p> <p>British Columbia: Not evaluated</p> <p>Data is provided in .TIF format and is subdivided in to both UTM zones, and provincial boundaries.</p>
Constraints	Data are subject to the Government of Canada Open Data Licence : <a href="http://open.canada.ca">http://open.canada.ca</a>
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	dataset
Feature Attribute Names	Class(Value)

### 3.2.4. AAFC Crop Inventory, 2012

Title	AAFC 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 to 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; imageryBaseMapsEarthCover;
Spatial Representation Type	grid
Spatial Resolution	30 m pixels
Geographic Description	All of Canada (except Newfoundland)
Supplemental Information	Overall accuracies for crop classes are:  Prince Edward Island: 79%  Nova Scotia: 90%  New Brunswick: 88%  Quebec: 82%  Ontario: 76%  Manitoba: 85%  Saskatchewan: 82%  Alberta: 88%  British Columbia: 73%

	Data is provided in .TIF format and is subdivided in to both UTM zones, and provincial boundaries
Constraints	Data are subject to the Government of Canada Open Data Licence : <a href="http://open.canada.ca">http://open.canada.ca</a>
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	dataset
Feature Attribute Names	Class(Value)

### 3.2.5. AAFC Crop Inventory, 2013

Title	AAFC 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 to 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 our regional AAFC colleagues
Purpose	An annual national crop type map
Topic Category	Farming; Environment; GeoscientificInformation; imageryBaseMapsEarthCover;
Spatial Representation Type	grid
Spatial Resolution	30 m pixels
Geographic Description	All of Canada
Supplemental Information	Overall accuracies for crop classes are:  Newfoundland: 98.8% (mainly pasture)  Prince Edward Island: 86.6%

	<p>Nova Scotia: 76.1%</p> <p>New Brunswick: 88.9%</p> <p>Quebec: 85.8%</p> <p>Ontario: 87.0%</p> <p>Manitoba: 85.4%</p> <p>Saskatchewan: 86.5%</p> <p>Alberta: 89.9%</p> <p>British Columbia: 79.2%</p> <p>Data is provided in .TIF format and is subdivided in to both UTM zones, and provincial boundaries</p>
Constraints	Data are subject to the Government of Canada Open Data Licence : <a href="http://open.canada.ca">http://open.canada.ca</a>
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	dataset
Feature Attribute Names	Class(Value)

**3.2.6. AAFC Crop Inventory, 2014**

Title	AAFC 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 to 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 our regional AAFC colleagues
Purpose	An annual national crop type map

Topic Category	Farming; Environment; GeoscientificInformation; imageryBaseMapsEarthCover;
Spatial Representation Type	grid
Spatial Resolution	30 m pixels
Geographic Description	All of Canada
Supplemental Information	<p>Overall accuracies for crop classes are:</p> <p>Newfoundland: Not evaluated</p> <p>Prince Edward Island: 81.0%</p> <p>Nova Scotia: 64.4%</p> <p>New Brunswick: 89.1%</p> <p>Quebec: 83.9%</p> <p>Ontario: 87.9%</p> <p>Manitoba: 90.3%</p> <p>Saskatchewan: 85.9%</p> <p>Alberta: 89.4%</p> <p>British Columbia: 88.4%</p> <p>Data is provided in .TIF format and is subdivided in to provincial boundaries</p>
Constraints	Data are subject to the Government of Canada Open Data Licence : <a href="http://open.canada.ca">http://open.canada.ca</a>
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	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	January 30, 2015
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			
	Feature Attribute Value		
	Label	Code	Definition
	Cloud	10	Areas unclassified due to cloud, shadow or other image quality factors.
	Water	20	Water bodies (lakes, reservoirs, rivers, streams, salt water, etc).
	Exposed Land / Barren	30	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	Land that 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, etc.
	Greenhouses	35	Greenhouses have been identified in British Columbia, Ontario, Prince Edward Island.
	Shrubland	50	Predominantly woody vegetation of relatively low height (generally +/-2 meters). May include grass or wetlands with woody vegetation, regenerating forest.
	Wetland	80	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).
	Grassland	110	Predominantly native grasses and other herbaceous vegetation, may include some shrubland cover.
	Agriculture (undifferentiated)	120	Agricultural land, including annual and perennial crops; and would exclude grassland. This class is mapped only if the distinction of sub-agricultural covers (classes 132-199) is not possible.
	Pasture / Forages	122	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	Agricultural fields that are normally seeded that remain unseeded due to excess spring moisture.
	Fallow	131	Plowed and harrowed fields that are left unsown for the growing season
	Cereals	132	This class is mapped only if the distinction of sub-cereal covers (classes 133-146) is not possible.
	Barley	133	
	Other Grains	134	
	Millet	135	
	Oats	136	
	Rye	137	
	Spelt	138	
	Triticale	139	
	Wheat	140	This sub-cereal class is mapped only if the distinction of sub-wheat covers (classes 145-146) is not

		possible.
Switchgrass	141	
Winter Wheat	145	
Spring Wheat	146	
Corn	147	
Tobacco	148	
Ginseng	149	
Oilseeds	150	This class is mapped only if the distinction of sub-oilseed covers (classes 151-158) is not possible.
Borage	151	
Camelina	152	
Canola / Rapeseed	153	
Flaxseed	154	
Mustard	155	
Safflower	156	
Sunflower	157	
Soybeans	158	
Pulses	160	This class is mapped only if the distinction of sub-pulse covers (classes 162-174) is not possible.
Peas	162	
Beans	167	
Lentils	174	
Vegetables	175	This class is mapped only if the distinction of sub-vegetable covers (classes 176-179) is not possible.
Tomatoes	176	
Potatoes	177	
Sugarbeets	178	
Other Vegetables	179	
Fruits	180	This class is mapped only if the distinction of sub-fruit covers (classes 181-190) is not possible.
Berries	181	
Cranberry	183	
Orchards	188	
Other Fruits	189	
Vineyards	190	
Hops	191	
Sod	192	
Herbs	193	
Nursery	194	
Buckwheat	195	

	Canary Seed	196	
	Hemp	197	
	Vetch	198	
	Other Crops	199	
	Forest (undifferentiated)	200	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	Predominantly coniferous forests or treed areas
	Broadleaf	220	Predominantly broadleaf/deciduous forests or treed areas.
	Mixedwood	230	Forest that is a combination of both the coniferous and broadleaf classes

## 5. REFERENCE SYSTEMS

### 5.1. Spatial reference system

```
PROJCS["NAD_1983_AAFC_Canada_Lambert",
GEOGCS["GCS_North_American_1983",
DATUM["D_North_American_1983",
SPHEROID["GRS_1980",6378137.0,298.257222101]],
PRIMEM["Greenwich",0.0],
UNIT["Degree",0.0174532925199433]],
PROJECTION["Lambert_Conformal_Conic"],
PARAMETER["False_Easting",6200000.0],
PARAMETER["False_Northing",3000000.0],
PARAMETER["Central_Meridian",-91.86666666666666],
PARAMETER["Standard_Parallel_1",49.0],
PARAMETER["Standard_Parallel_2",77.0],
PARAMETER["Latitude_Of_Origin",63.390675],
UNIT["Meter",1.0]]
```

Horizontal coordinate reference system:

Map projection:

### 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 (Landsat-5, Landsat-8, AWiFS, DMC) and radar (RADARSAT-2) images are collected in conjunction with ground data provided by AAFC personnel 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 (Landsat-5, Landsat-8, AWiFS, DMC, SPOT and RapidEye) and radar (RADARSAT-2) 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 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 image-based segmentation is then performed to clean up any speckling within the classification, before a final accuracy is assessed.

More than 1500 satellite images, each linked to 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.

We acknowledge the following contributors:

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

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

Canadian Space Agency, <http://www.asc-csa.gc.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](http://www.masc.mb.ca)

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

PIX

format name: PCI Geomatics database file

version:

specification:

languages: eng

character set: utf8

## 11. METADATA

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