

# Drought Watch: Earth Observation Information for Climate Assessment

## Summary

Canada's Drought Watch Program provides timely information on the impacts of climatic variability on water supply and agriculture, and promotes practices to reduce drought vulnerability and improve management during a drought. Drought Watch is a joint initiative between Agriculture and Agri-Food Canada (AAFC), the National Land and Water Information Service (NLWIS) and Environment Canada to share near real-time data for drought monitoring interpretations. NLWIS provides open and free access to data, information and tools over the Internet to support sound land use decision making by Canadians. NLWIS is also generating new information to fill critical gaps identified by user requirements. NLWIS will conform to the Canadian Geospatial Data Infrastructure (CGDI) and international (Open Geospatial Consortium, OGC) standards. NLWIS and AAFC's research community are working together in developing the next generation of Earth observation products to meet ongoing and emerging user needs.

## Relevance to GEO

The climate information provided through Drought Watch meets many of the user needs documented in the Socio-Economic Benefit Areas (SEBAs) identified by the GEO international community, including:

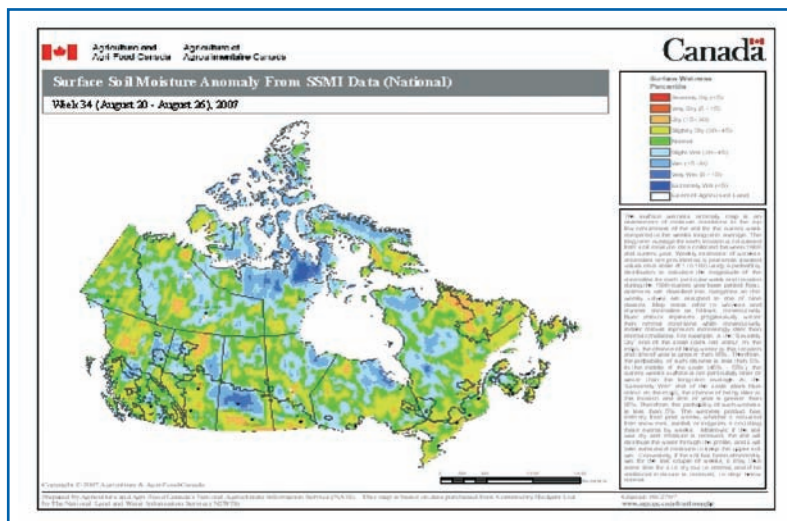
- Reducing loss of life and property from natural and human-induced disasters;
- Understanding, assessing, predicting, mitigating and adapting to climate variability and change;
- Improving water resource management through better understanding of the water cycle;
- Supporting sustainable agriculture and combating desertification;

Some key Drought Watch earth observation initiatives of relevance to GEO are described below.

## 1.1 Soil Moisture Monitoring

### Description

AAFC is currently using enhanced passive microwave data for the development of qualitative coarse-scale information on surface wetness and temperature (Figure 1). Researchers are also developing approaches to using Synthetic Aperture Radar (SAR) and multi-angle radar data that will improve the resolution and provide qualitative soil moisture monitoring data. In the future, soil moisture monitoring in Canada will be based on integrated monitoring networks that incorporate passive microwave systems with SAR and in-situ monitoring networks.



## Added Value

Knowledge of absolute and relative soil moisture is of critical importance to agriculture. Soil moisture is a sensitive indicator of crop moisture stress and the onset of drought and plays a key role in crop productivity. It influences field activities (tillage, seeding, irrigation) and also is a key indicator of runoff potential and a key input for weather forecast modeling. As such, soil moisture is a critical data requirement to AAFC's monitoring, forecasting and responding needs.

## 1.2 Near-Real-Time Climate Networks

### Description

The extent, location and severity of temperature and precipitation events relevant to agriculture are monitored and analyzed in near real time and distributed on AAFC's Drought Watch Web site (Figure 2), a Canada-USA cooperative service. AAFC is integrating Environment Canada's weather monitoring data and data from provincial networks to provide daily updates on conditions for the industry. Weather data is assembled into a common format, screened and verified where possible before maps showing several analytical products are prepared with GIS technology. The information is a key input for identifying drought and other weather-related disasters and for developing mitigation programs.

### Added Value

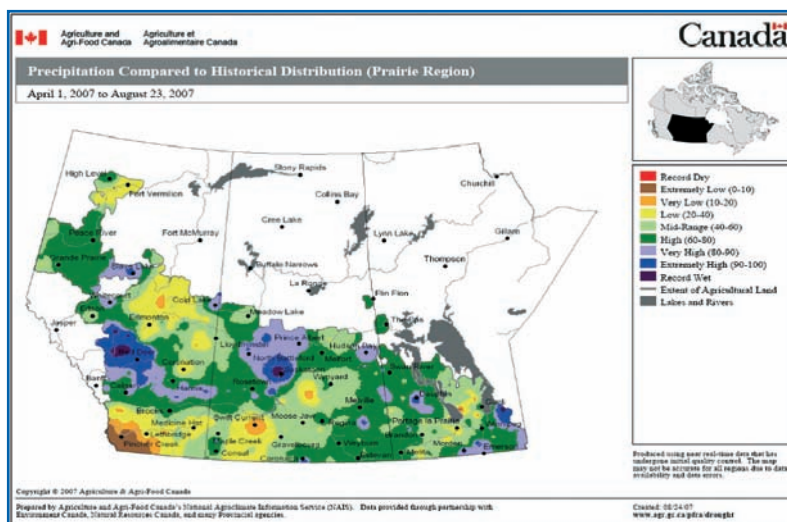
The information helps to address many agricultural sustainability issues, such as drought identification and monitoring, and to support risk management. It contributes to the delivery of AAFC policies and programs on business risk management and environmental sustainability of the agricultural sector.

### Participants

AAFC leads this initiative and is the Canadian author for the North American Drought Monitor. It works closely with Environment Canada, Natural Resources Canada (Canadian Forestry Service), the U.S. National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Agriculture, and several provincial agencies and private companies.

### Current Status and Next Steps

AAFC's *Drought Watch* Web site provides national and regional coverage of the agriculture areas for temperature and precipitation as well as several related products. Discussions with Environment Canada are ongoing toward utilizing its Data Management Framework for data access and quality control. Key outstanding issues include acquiring resources to improve spatial and temporal resolution of the monitoring data, getting products to the user faster, assimilating new networks, identifying data standards for agricultural needs, addressing missing data and developing new tools for risk management and decision support.



Growing season precipitation compared to historical distribution