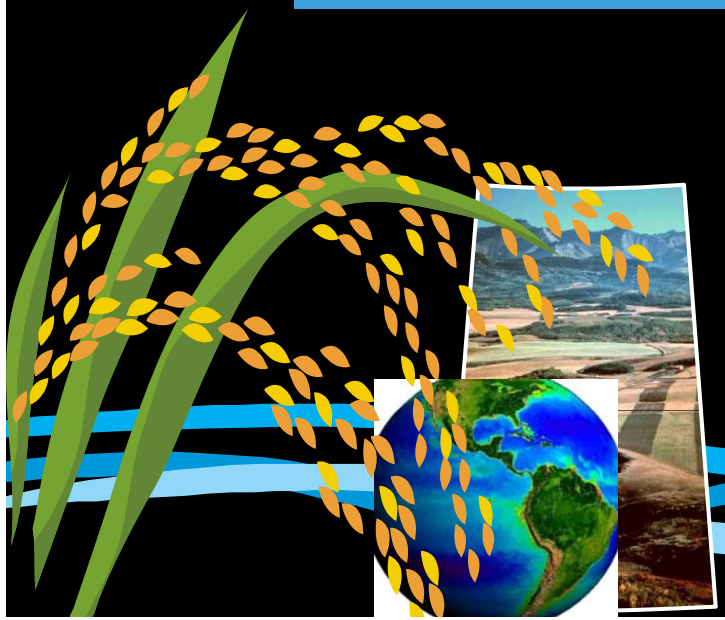
SUPPLY

MANAGEMENT

QUALITY

WATER, AGRICULTURE & FOOD

Opportunities and Challenges



Andrea Kalischuk
Branch Head, Water Quality

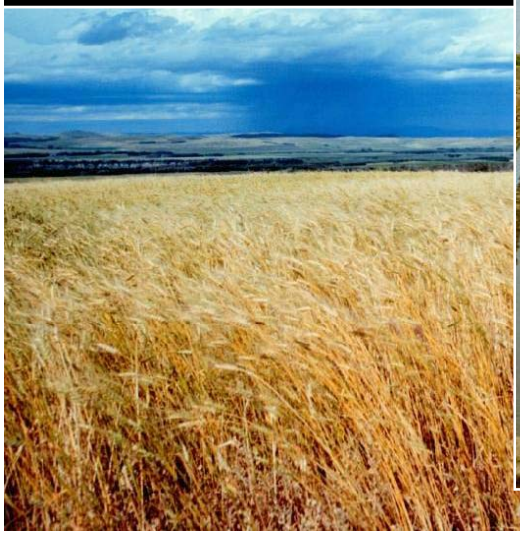
March 13, Leduc
AEPA and WPAC ag reps

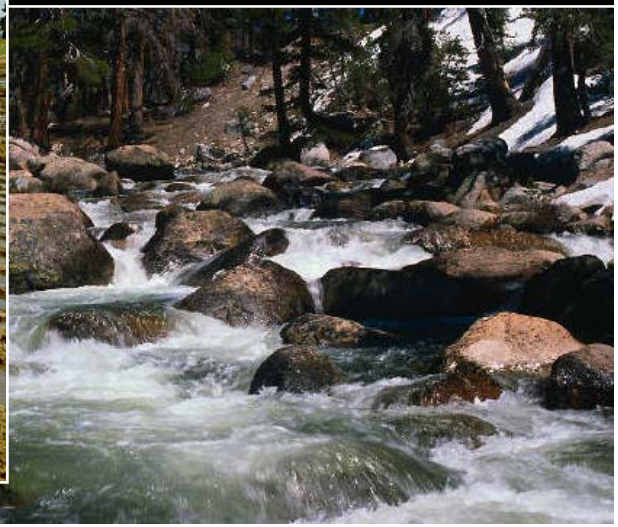
Water, agriculture and food have been closely linked throughout history.

Land and Water

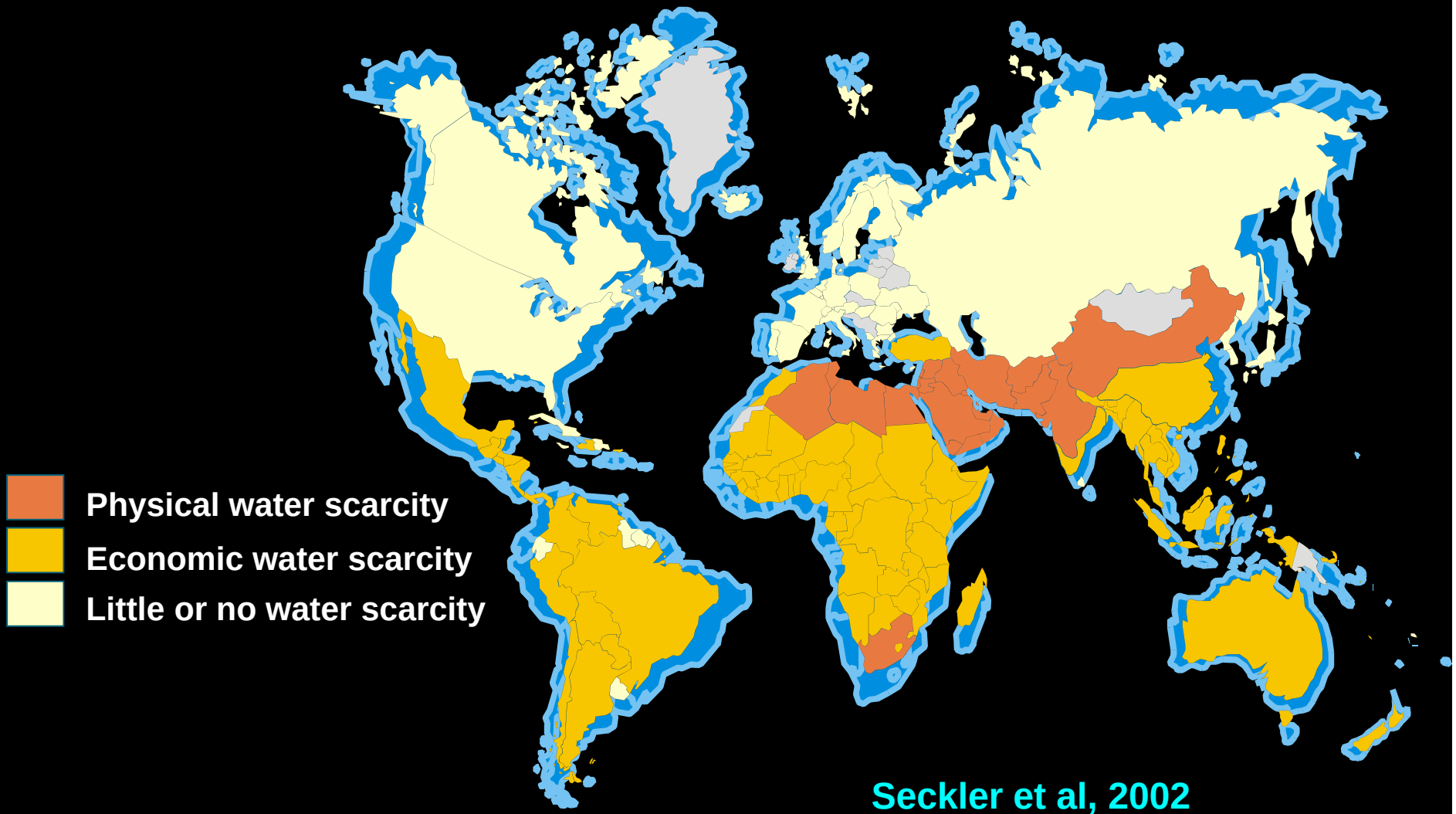
- **Land was the major focus during the 20th Century.**

- **Water will be the dominant focus of the 21st Century.**





Projected Water Scarcity in 2025



Seckler et al, 2002

Planning For Food

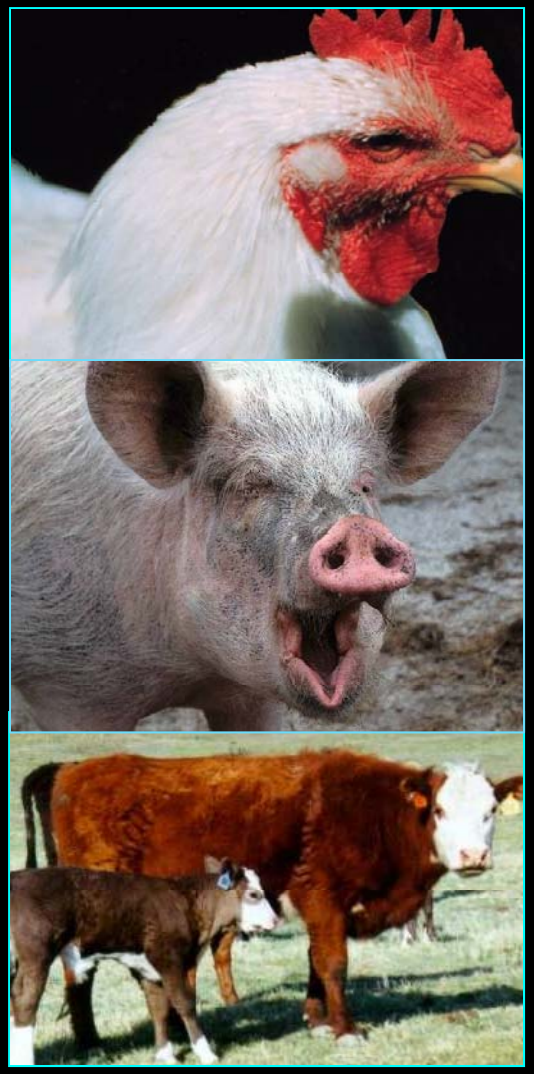
- Food-poor but cash-rich countries are buying up agricultural rights in developing countries and “bread basket” countries.
  - South Korea – 99 year lease on 3.2 million acres in Madagascar.
  - China – 100,000 acres in Australia.
  - Japan – 500,000 acres in the U.S.
- Russia recently restricted exports of wheat.

Future World Food Requirements

- **World food requirements could double in the next 40 years.**
  - **Population – will grow from 6.5 Billion to 9.2 Billion.**
  - **Per capita food consumption will increase.**
  - **Significant changes in diet.**

Implications to Cereal Production

- 1 kg of chicken meat requires:
  - 3 kg of grain equivalents;
- 1 kg of pork meat requires:
  - 5 kg of grain equivalents
- 1 kg of beef requires:
  - 8 kg of grain equivalents;



Food Production

- About 60% of the world's food is produced on rainfed lands.
- Significant increases in production on rainfed lands are difficult – genetic engineering has not yet developed high yielding, drought-resistant varieties.

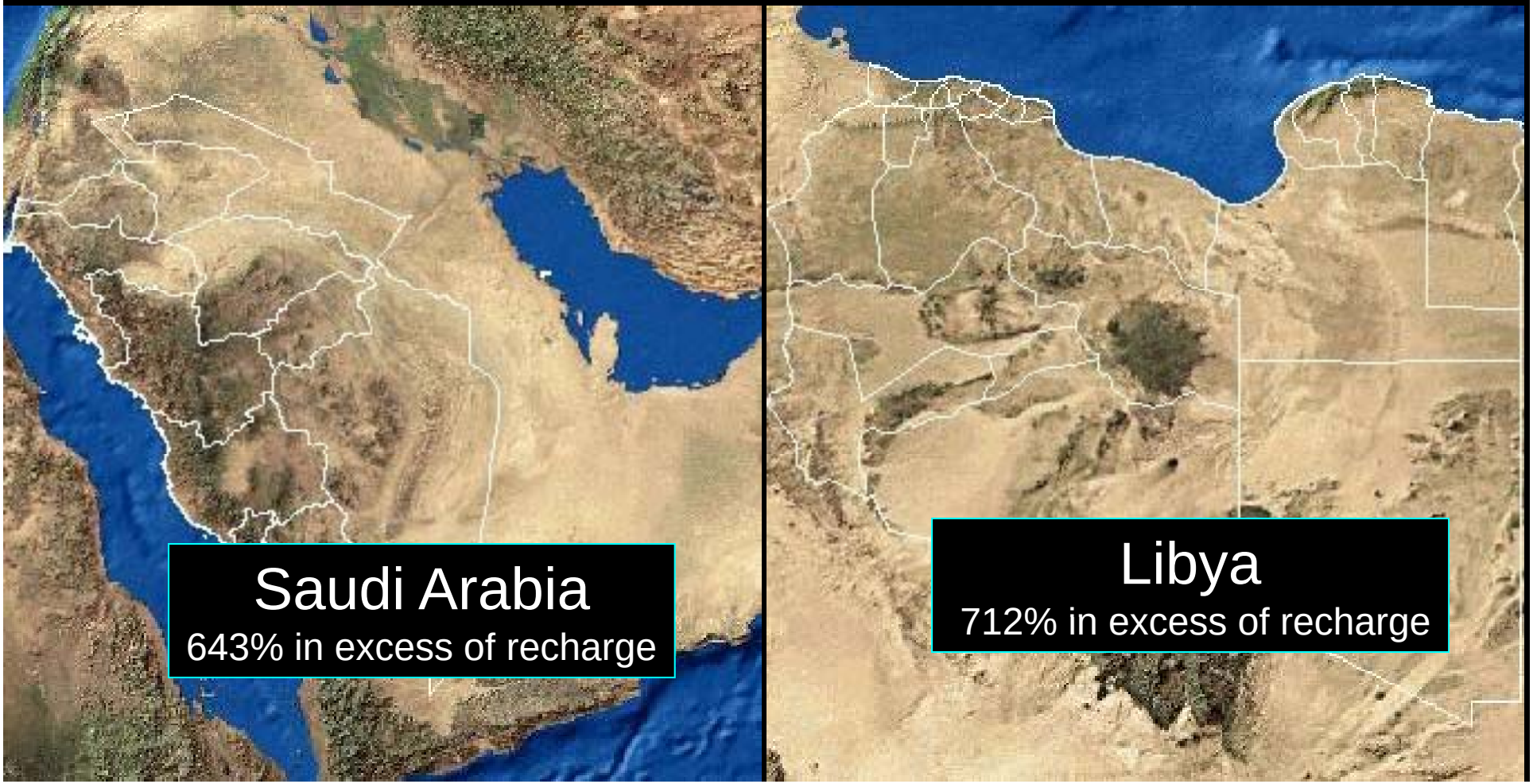
Irrigated Food Production

- About 40% of the world's food, and 60% of cereal production is from irrigated lands.
- Irrigation makes up about 17% of the total arable land base.
- It is estimated that up to 80% of future food requirements will be met by irrigation.

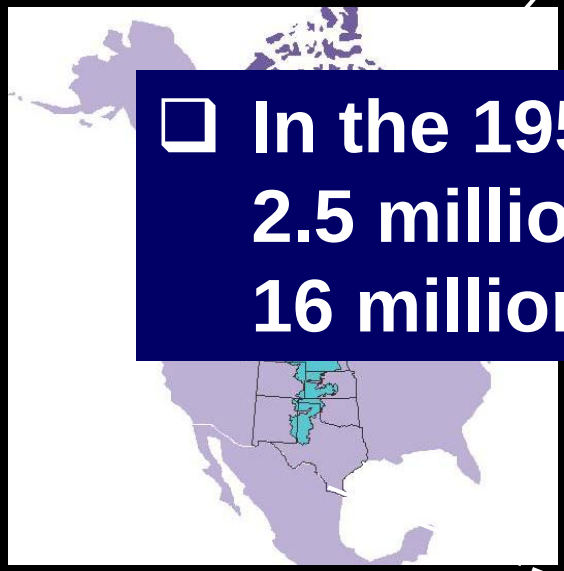
Groundwater

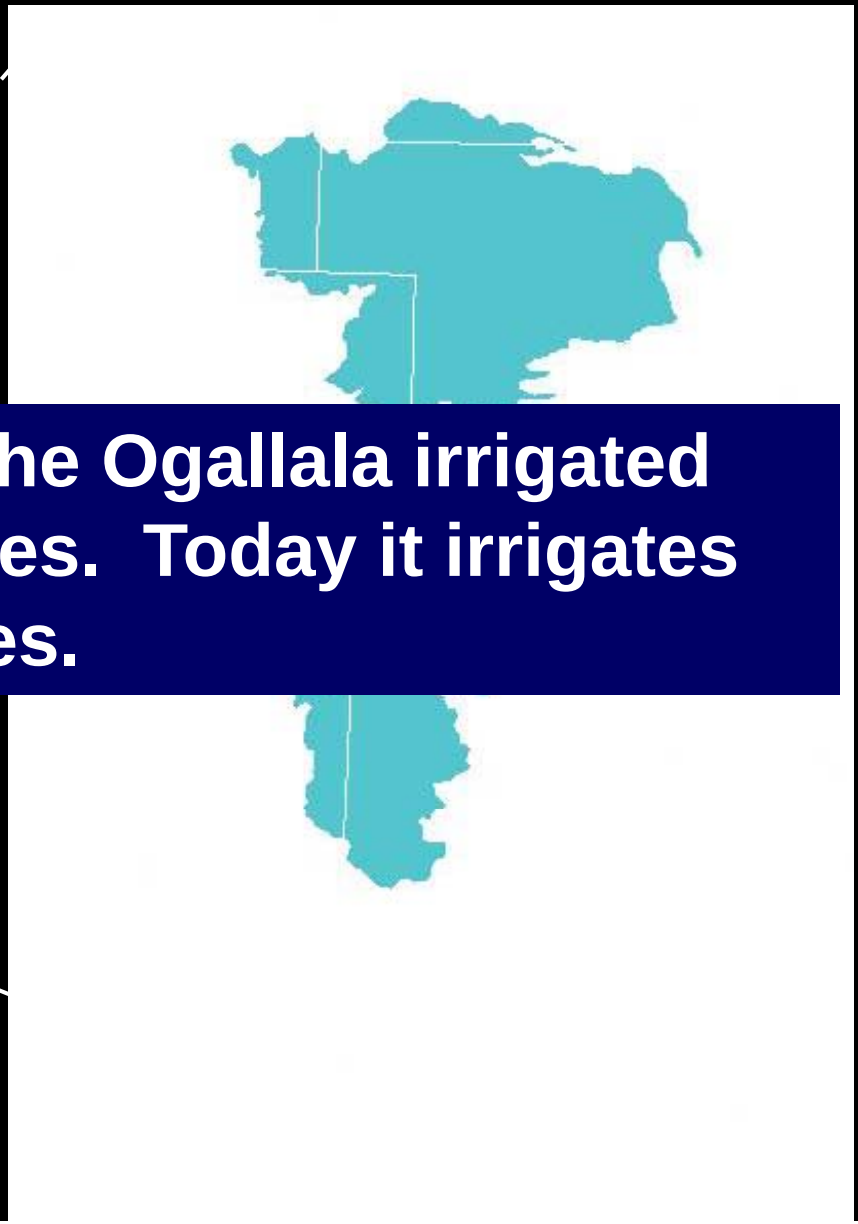
- **Many countries currently rely on “Fossil” groundwater for irrigation.**
- **These groundwater resources are being depleted at an increasingly rapid rate.**
- **And once they are gone, they are gone forever.**

Fossil Groundwater Use for Food Production



The Ogallala Aquifer





- In the 1950s, the Ogallala irrigated 2.5 million acres. Today it irrigates 16 million acres.

The Ogallala Aquifer*

- It underlies 174,000 square miles.
  - **Nebraska – 64,400 sq. miles**
  - **Texas – 36,080 sq. miles**
  - **New Mexico - <10,000 sq. miles**
  - **Oklahoma - <10,000 sq. miles**
  - **South Dakota - <10,000 sq. miles**
  - **Wyoming - <10,000 sq. miles**
- The aquifer contains 3.3 billion acre-feet of water.

- Alberta's total annual water supply from all rivers is about 0.1 Billion acre-feet.

* M. V. Guru – the Ogallala Aquifer – July, 2000 (Kerr Centre for Sustainable Agriculture)

Water and Alberta's Agriculture Industry

- **Alberta is at a water management crossroads, and critical decisions are needed to determine the right path to follow.**

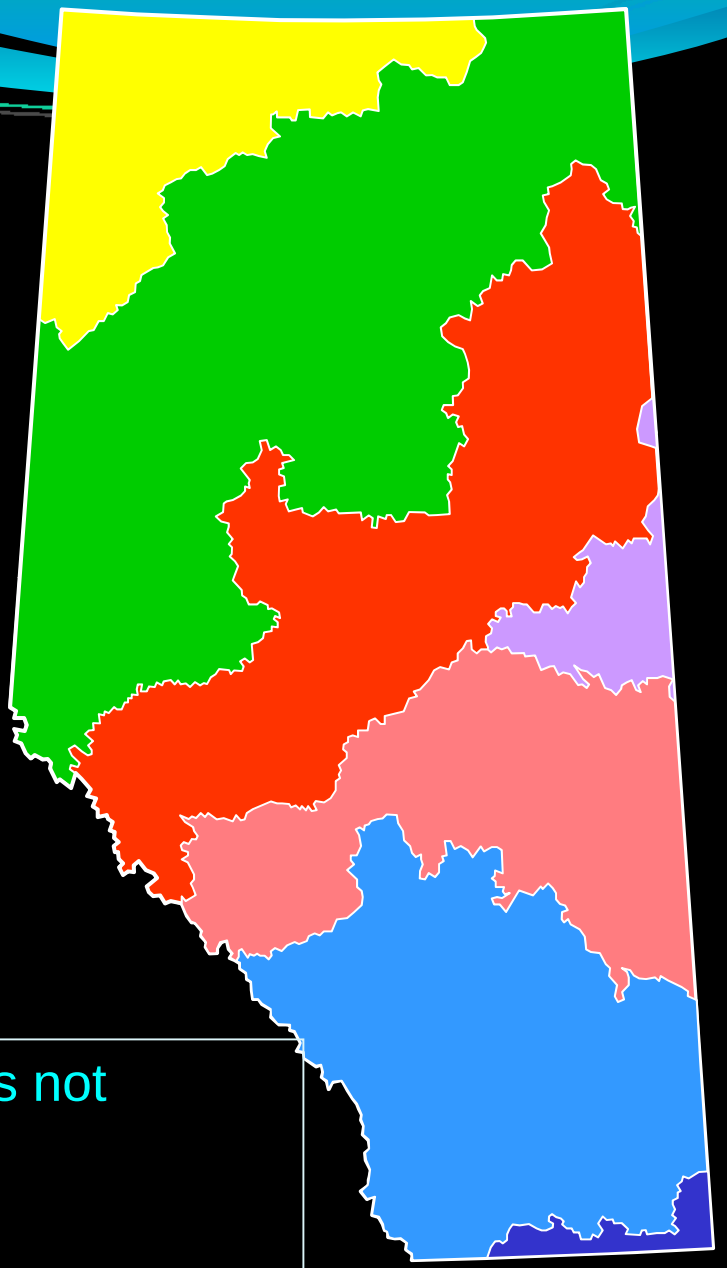
- **Agriculture needs to be an important consideration in those decisions.**




Annual River Discharges and Use

- Total outflow from Alberta's rivers is about 105 million acre-feet per year.
- Total volume withdrawn – 3.8 million acre-feet (3.6%).
- Total volume consumed – 2.1 million acre-feet (2%).

Alberta Watersheds



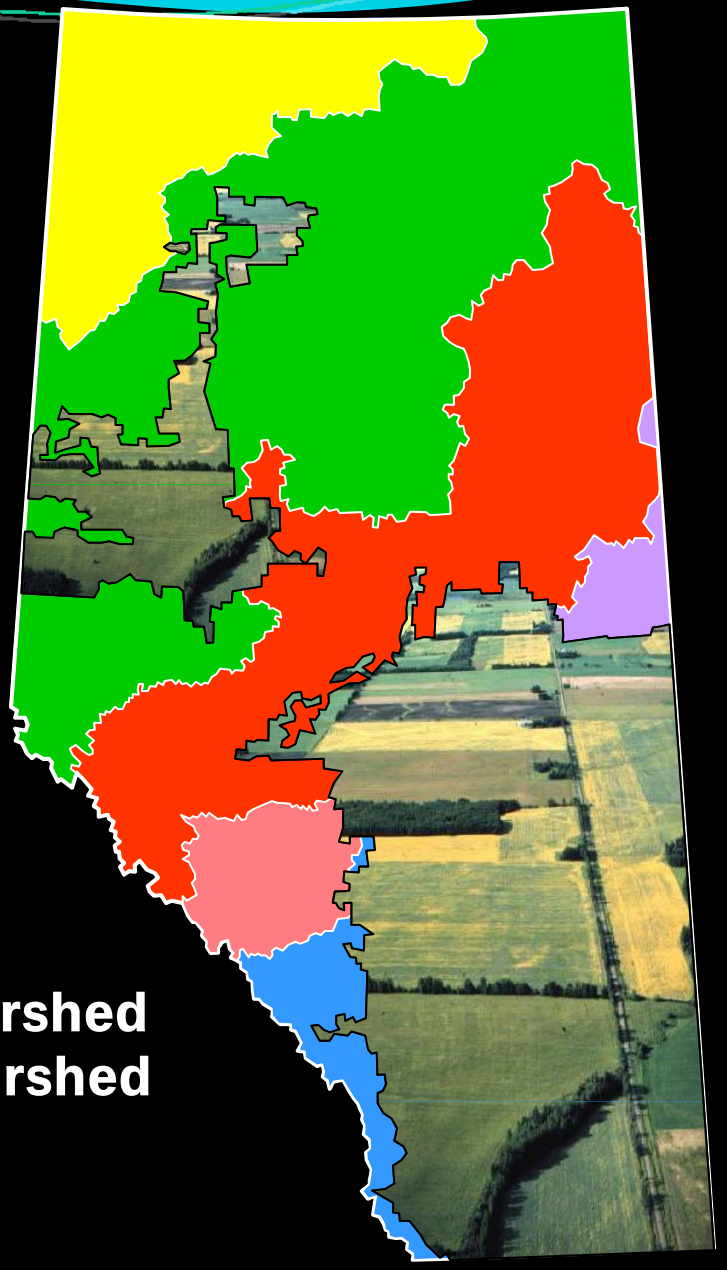
- Hay River Watershed
- Peace River Watershed
- Athabasca River Watershed
- Beaver River Watershed
- North Saskatchewan River Watershed
- South Saskatchewan River Watershed
- Milk River Watershed

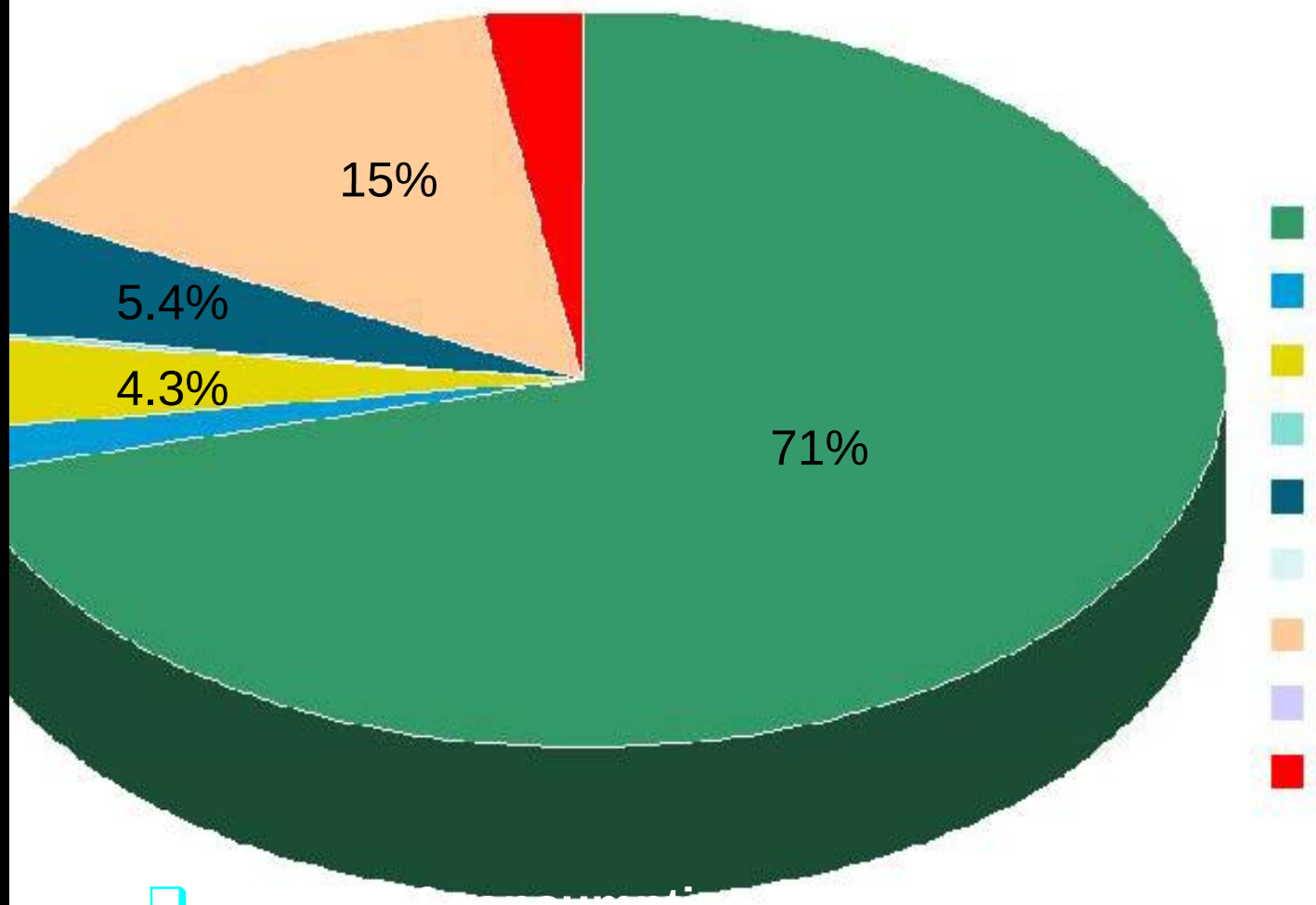
- Transfer of water between these watersheds is not allowed without special provincial legislation.
- Bulk export of water is also not allowed.

Major Alberta Watersheds

Agricultural land

- **Hay River Watershed**
- **Peace River Watershed**
- **Athabasca River Watershed**
- **Beaver River Watershed**
- **North Saskatchewan River Watershed**
- **South Saskatchewan River Watershed**
- **Milk River Watershed**

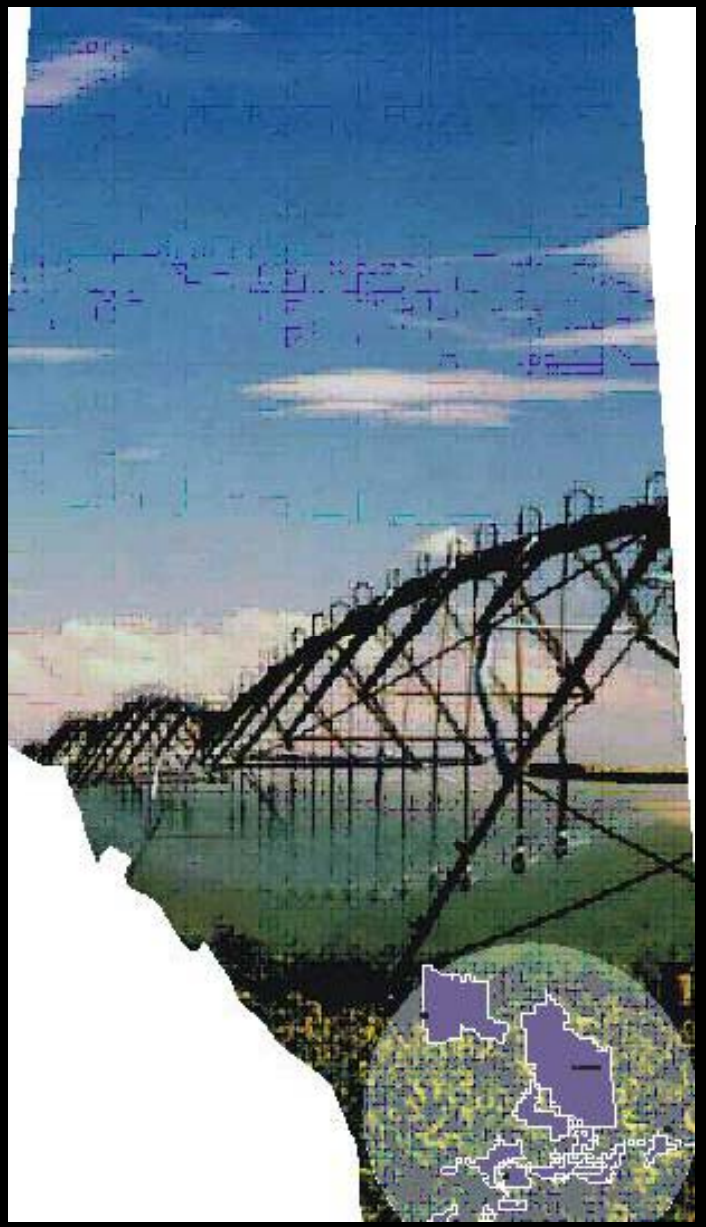




- **Currently 500,000 domestic wells in Alberta.**
- **About 7,000 new wells are added each year.**

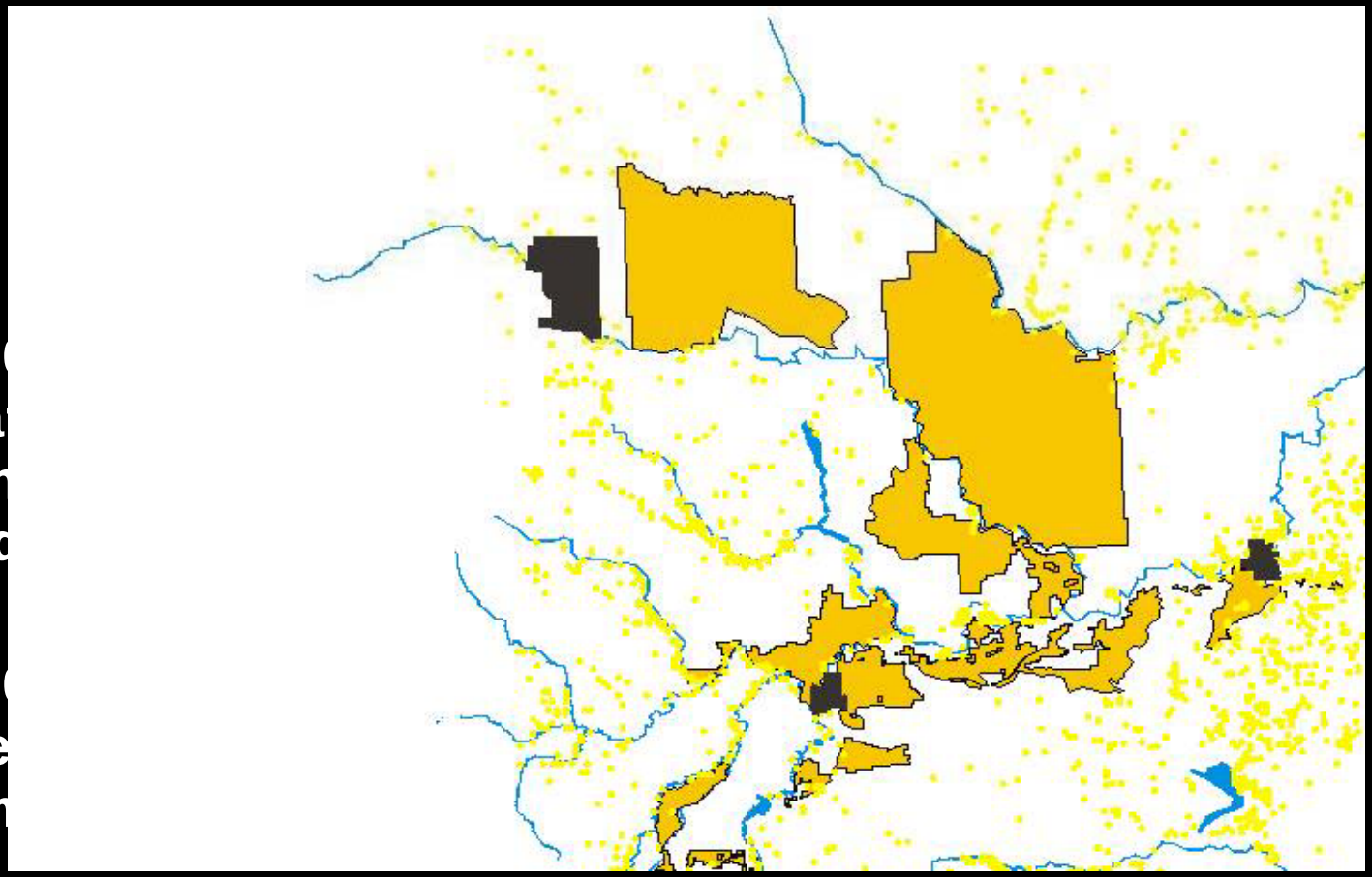
Irrigation in Alberta

- About 640,000 ha of land is irrigated in both organized districts and private schemes.
- This accounts for 60% of Canada's total.
- Most of the irrigation takes place in the SSRB.



Irrigation in Alberta

- About 52
  the irriga
  located in
  organized
  districts.
- About 12
  in private
  developm

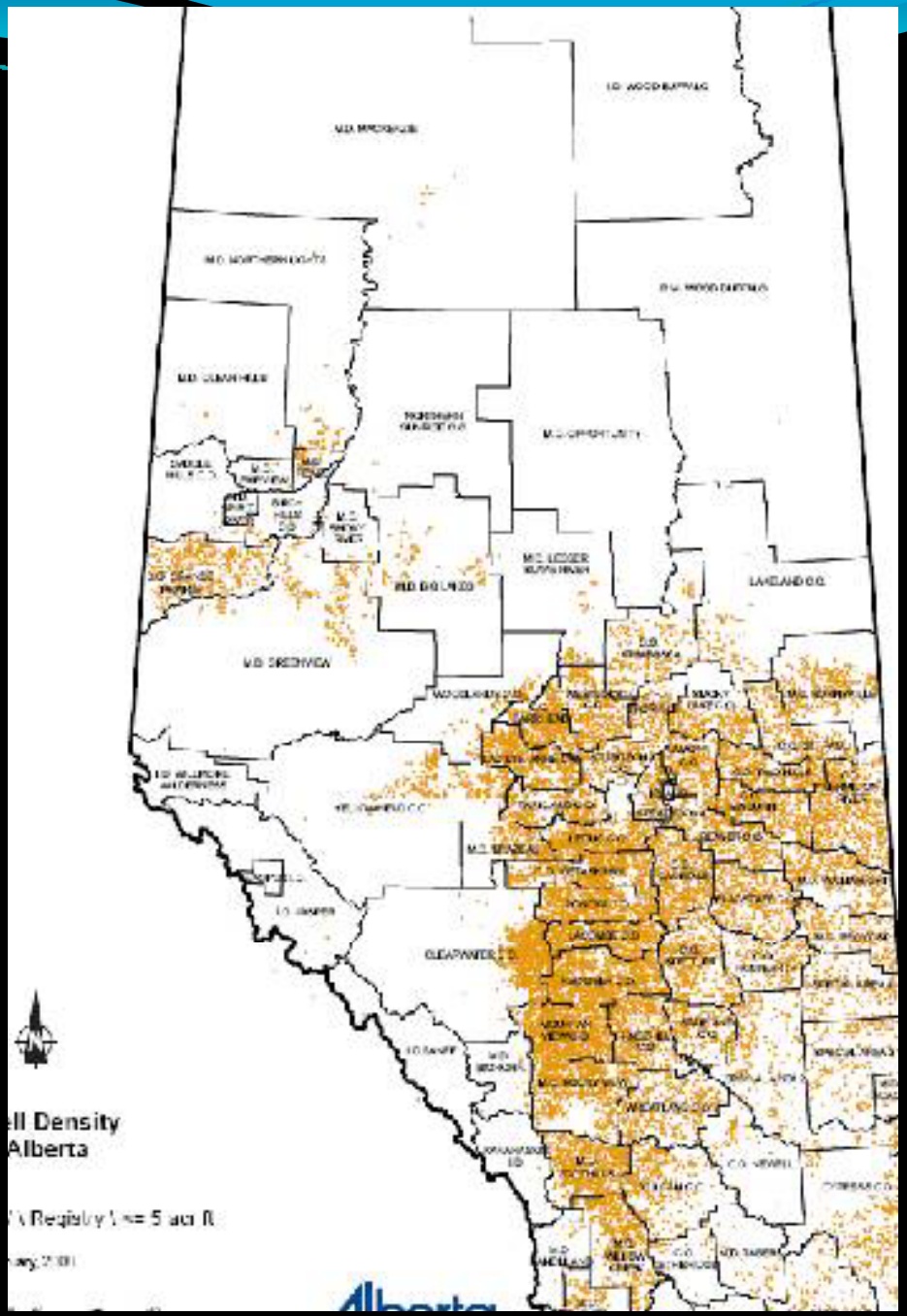


Groundwater

- **We understand much less about our groundwater resources than our surface water resources.**

- **Groundwater is an important resource for Alberta's agriculture industry and rural residents.**

Groundwater Well Distribution



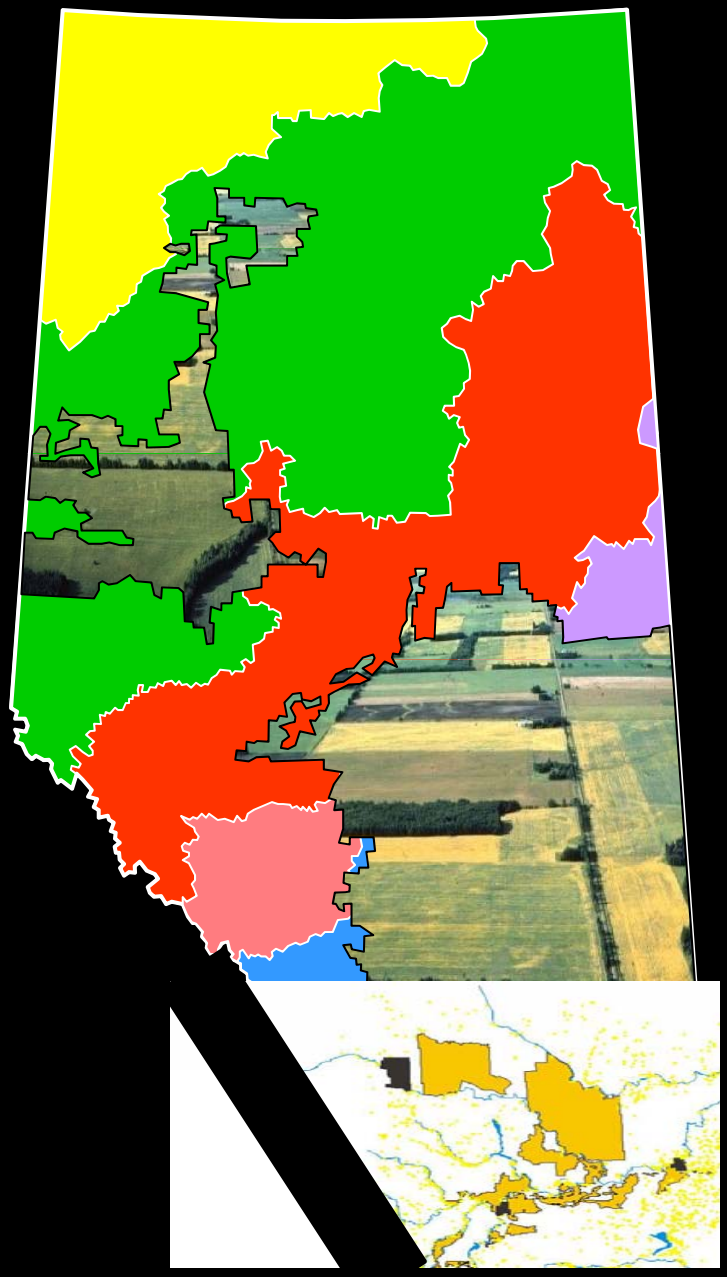
Alberta's Agricultural Opportunities and Challenges


Alberta is positioned to play a major role in helping meet future world food needs.

Production and Diversification

Alberta's advantages:

- **a large agricultural land base;**
- **a strong dryland agriculture; and**
- **a world-class irrigation system.**



Production Potential

- Alberta has significant room to increase crop and livestock production in response to world markets.
- The agriculture industry needs access to adequate, good quality water to meet the potential of a growing world marketplace.