Shelterbelts and Climate Change

What Are Shelterbelts

Shelterbelts are vegetation systems that use trees and shrubs to redirect wind and reduce wind speeds, thereby modifying environmental conditions around the area where the trees and shrubs are planted.

Canada's Shelterbelt Program

Agriculture and Agri-Food Canada's Shelterbelt Program promotes the environmental and economic benefits of land management practices that combine trees and shrubs (in this case, shelterbelts) with crop and livestock production. This practice is known as agroforestry.

A Regional and National Effort

- Specifically, the Shelterbelt Program promotes the use of agroforestry in Canada's prairie region through:

  - research;
  - technology transfer; and
  - providing trees and shrub seedlings to Prairie farmers and other eligible clients.

- Agriculture and Agri-Food Canada (AAFC) also promotes agroforestry on a national scale through Greencover Canada, a new five-year program designed to promote sustainable land use and to expand the land base covered by perennial forage and trees.

The Shelterbelt Centre

The AAFC's Shelterbelt Centre at Indian Head, Saskatchewan was established in 1901 by the Canadian government to provide shelterbelt material to prairie farmers.

The Centre has produced and distributed over 570 million seedlings to agriculture producers in the Canadian prairie region. This includes the provinces of Manitoba, Saskatchewan, Alberta and the Peace River District of British Columbia.

Some 5 to 6 million trees and shrubs are planted annually in shelterbelts through this program.

Shelterbelt Benefits

Protects soil, water, crops, buildings, livestock and wildlife habitat.

Requires little land conversion, allowing agricultural land to remain productive.

Complements the economic and environmental sustainability of the farm.

Helps counteract the effects of climate change.

Protection of Water and Soil Resources

Shelterbelts situated along the banks of rivers or streams can intercept agricultural wastes and run-off, reducing the potential of groundwater and surface water contamination.

Field shelterbelts protect soil from wind erosion in areas up to 20 times their own height. For example, a grouping of 10 foot trees would create a 200 foot "shelter" behind it.

Energy Savings By Shelterbelts

Studies conducted by Agriculture and Agri-Food Canada have shown that properly designed shelterbelts can reduce the heating costs of farm buildings by 30%. Depending on the source of energy used, greenhouse gas emission reductions, as well as financial savings can be considerable.
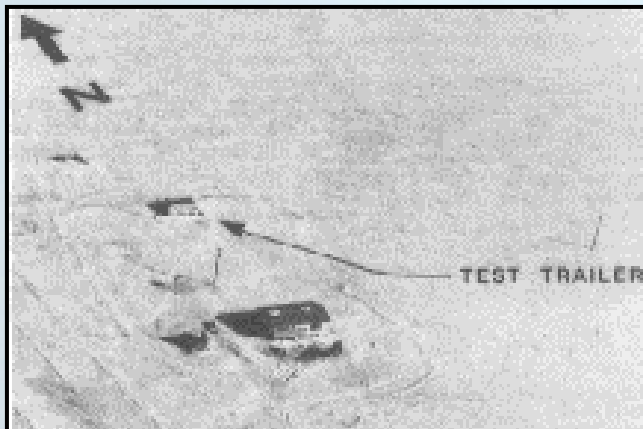
Non-sheltered Farm Yard

Sheltered Farm Yard

Shelterbelts and Climate Change

One of the largest contributors to climate change is the release of carbon dioxide (a greenhouse gas) into the atmosphere. The majority of carbon is released when fossil fuels are burned. Unfortunately, the world burns a lot of fossil fuel.

Creating shelterbelts can help! For example, trees and shrubs remove carbon dioxide from the atmosphere. Because they need carbon to live and grow, they absorb carbon from the air and store it. Soil also stores carbon, so planting trees and shrubs can keep carbon-absorbing soil from blowing away.

Keeping Track of Carbon

Agriculture and Agri-Food Canada began investigating the potential for prairie shelterbelts to absorb atmospheric carbon in the early 1990s.

Easy and accurate methods of measuring shelterbelt carbon were developed and the rate of carbon accumulation by shelterbelts was determined.

Using this data we are able to predict carbon potential of current and future shelterbelt planting programs.
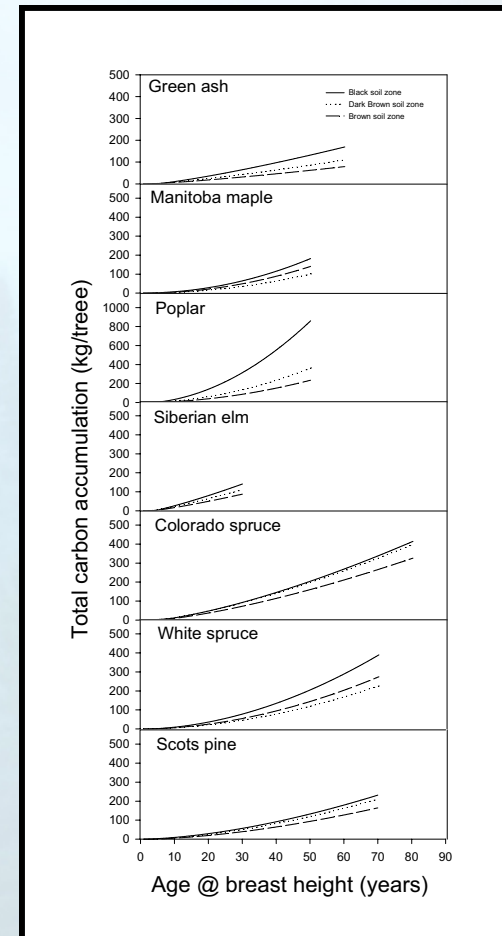
Carbon Absorption Potential

According to AAFC predictions, trees and shrubs planted through its Shelterbelt Program will help absorb approximately 13.2 Megatonnes (Mt) of atmospheric carbon from 2008-2040.

Projections were based on the assumption that planting for 2000-2040 would occur at the rate of 5.3 million trees per year.
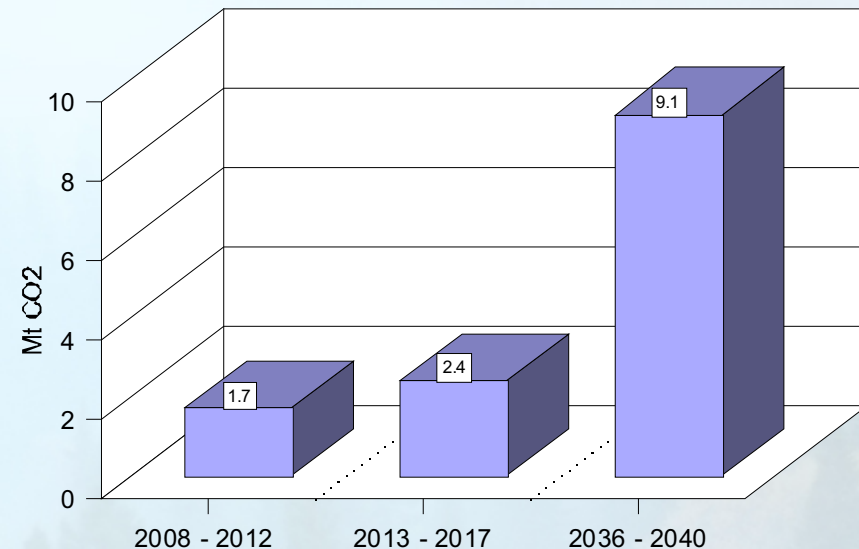
Predicted C sequestration by shelterbelts in the Canadian prairies 2000- 2040 (Mt CO_2)

Adaptation to Climate Change

How well shelterbelt trees and shrubs can adapt to the effects of climate change depends on the ability of a particular population or species to alter its physiology in response to changing environmental conditions.

Desirable Traits

Shelterbelt species or ecotypes that would adapt well to the effects of climate change include those that:

- can survive extreme winter temperatures;
- are drought resistant, with high water- and nitrogen-use efficiency;
- grow quickly;
- are responsive to increasing atmospheric CO_2;
- are adaptable to short summers, and early or late frosts;
- are insect and disease resistant.

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A Team Effort

The AAFC and the Canadian Forest Service (CFS) work together and exchange information and technology on tree-related climate change research and activities, including:

- Development of carbon storage data for tree species used in Canadian forestry and agriculture
- Tree improvement research related to climate change adaptation
- Mapping systems for land suitability of tree species on agricultural lands
- Partnerships through Canada's Action Plan 2000 on Climate Change

**For more information on
Agriculture and Agri-Food Canada's
Shelterbelt Program, contact:**

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