



Short-Rotation Woody Crops

For many, trees are a symbol of age and resilience. In the right conditions, white spruce trees, for example, can live for more than 350 years.

Foresters may not have to wait centuries, but the usual fifty or sixty years from planting to harvest is still a long time to wait. What if foresters could cut their waiting time from half a century to just twenty years, leaving old-growth forests, their ecosystems and species diversity, while mitigating greenhouse gas emissions and generating more wood fibre?

Between 2002 and 2005, Tim Keddy and Derek Sidders of the Canadian Forest Service's Canadian Wood Fibre Centre (CFS/CWFC), established an 18-hectare short rotation woody crop (SRWC) site at University of Alberta Ellerslie Research Farm in Edmonton, Alberta to do just that. Since then, Tim and Derek have expanded both the amount of land on which they have planted trees and expanded the number of research partners, collaborating with universities, governments, private landowners and the industry.

The Ellerslie site was a key part of forming a

national network of forest innovators and practitioners, Indigenous community leaders, landowners, suppliers, and carbon budget researchers. Together they found a way to produce quality woody biomass and quickly and identify realize all of its environmental and economic

benefits. First Nations peoples in the Prairies were key partners as the research group established several successful plantations while sharing new techniques so that communities could independently establish forests on land not previously forested.



Fast-growing tree crops

Compared to slower growing trees like spruces, hybrid poplars and selected aspens grown in these plantations are ready for harvest in less than 20 years. The technology

development specialists scientists established this a mixed wood crop to evaluate how short-rotation or fast-growing tree crops (123 to 17 years to maturity) could sustain and expand the bioenergy sector. High-yield crops like these are crucial for the sector, which relies on woody biomass to produce clean energy.

Mixed wood afforestation with these trees mimics

existing natural mixed wood forests in western Canada, where the hardwood poplar protects softwood trees. This crop maximizes the land's biomass, fibre, and carbon storage potential. Testing the tree crop on non-forested agricultural land, the team also studied how to lower harvesting, processing, and transportation costs, making the woody crops economical for everyone.

The bottom line – multiple positive impacts: environmental, economic and more

Tree crops are a low-cost, high-yield way to afforest land, store carbon, create a new source of fibre for commercial forest products and produce biomass for energy.

This was well-demonstrated at the Ellerslie site where CWFC researchers developed and tested non-chemical planting and management strategies that allowed the trees to grow at least eight times faster than the national forest growth average.

SWRC can also serve as potential cash crops for landowners. Short rotations plantations offer a more consistent and purpose-grown wood fibre and therefore, offer landowners, and fibre and woody biomass consumers a way to increase the local fibre availability, and to provide a more consistent supply of the type of fibre they want.

SWRC plantations also contribute help mitigate climate change by storing high amounts of CO₂ ; CWFC research shows that each year, each hectare of a plantation can store 17.8 – 24.3 tonnes of CO₂. This compares to rates of about 6 tonnes per year for mature forests in Canada. These higher rates for SWRC plantations can help mitigate climate change impacts.

This is especially important given climate change

and the change in the increase and intensity of many natural disturbances affecting forests. These disturbances, such as extreme weather events, forest fires, and forest pests are mostly uncontrollable and can significantly affect how consistently Canada's managed forests to absorb more CO₂ than they emit. Improved forest management and use of harvested wood products can mitigate the effects of climate change.

CWFC's short rotation wood crop research provides the knowledge and technology we need to mitigate the effects of climate change by improving how we manage forests and use harvested wood products.

“Forestry is a long-term game,” Tim Keddy says. “It doesn't happen very often in a forestry career where you get to establish a plantation and then get to harvest it for the products for which it was intended. It's been an exciting and fulfilling 18 years of research!”



Learn more

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