Branching Out

from the Canadian Forest Service - Laurentian Forestry Centre

Assessing the Bioenergy Potential of Poplar and Willow Plantations

Establishing a plantation with rapid-growth species for bioenergy purposes, such as hybrid poplars or willows, is one thing. But estimating the quantity of biomass that it contains is quite another thing. To meet this requirement, a Canadian Forest Service team developed the ENBIOCAL (ENergy BIOmass CALculation) tool.

Step 1: Calculate the number of trees to be sampled

For willow and hybrid poplar plantations, the ENBIOCAL tool uses two methods based on the basic principles of sampling theory: simple random sampling and stratified random sampling. These methods help users to determine the minimum number of samples required to estimate the quantity of biomass in a plantation based on the desired level of accuracy. Simple random sampling is suitable for plantations made up of trees growing in relatively homogeneous site conditions, while stratified random sampling applies to plantations growing in heterogeneous conditions that may be divided into relatively homogeneous strata.

Photo: NRCan

Step 2: Estimate the total quantity of biomass

With the field data gathered by following the instructions contained in the ENBIOCAL software program and user's guide, it is possible to estimate the total quantity of biomass in the plantation. The main advantage of this tool is that it can be used to select the sample-gathering method, determine the number of representative samples in the plantation, and estimate the quantity of biomass in the plantation at the same time. The application can also be used to estimate the quantity of biomass on uncultivated land.

Other benefits

The ENBIOCAL tool is free and user-friendly, and can also be used to:

• predict the quantity of biomass in a tree with several stems by measuring the height and diameter of several stems according to a procedure that varies, depending on the species;

• estimate the quantity of biomass in small-diameter woody species on uncultivated land;

• calculate the surface area of a plantation or area of uncultivated land using georeferenced data.

Plantations of rapid-growth species have significant economic potential for bioenergy production owing to the short amount of time required to obtain substantial yields. This research work will be used to obtain biomass yield indicators and assess their profitability.

Useful links

To access the tool: http://www.rlq.uqam.ca/cartable/CALBIOEN/calbioen_en.php

To consult the user's guide: http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/36380.pdf

For more information, please contact:
Guy Larocque
Natural Resources Canada
Canadian Forest Service
Laurentian Forestry Centre
1055 du P.E.P.S., P.O. Box 10380, Stn. Sainte-Foy
Quebec City, Quebec G1V 4C7
418-648-5791 • guy.larocque@canada.ca
nrcan.gc.ca/forests

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