



DEFIFORBOIS

DEveloppement et durabilité de la Filière FORêt-BOIS en région Centre

PSDR4 Programme – Région Centre Val de Loire

Summary in english

Sustainable forest management and fuel wood production in the Center-Val de Loire region

How can we harvest trees on the poor forest soils of the Center region to sustainably produce fuel wood?

For the past ten years, mechanical harvesting has been carried out in poor or declining stands, then the whole tree is ground up to produce chips for biomass boilers (the whole tree extraction method). Grinding small branches, twigs, and sometimes even leaves and dead wood, exports many more minerals from forest stands than when logging residue is left in the forest (this is a comparison here). The risks are reduced soil fertility and habitat destruction, which are contrary to sustainable forest management practices. As society demands more materials and more renewable energy, how can we harvest and manage these stands without decreasing soil fertility? What reforestation techniques can we implement to give our forests a bright post-harvest future?

Together, the INRAE, FCBA, ONF, CNPF, Unisylva and Arbocentre have analyzed harvesting techniques for forest chip production and their impact on soil fertility and biodiversity. These institutions propose testing the behavior of new species in plantations to ensure sustainable management of the region's forests in the context of a climate emergency.

Analysis of harvesting practices for wood energy in the Centre-Val de Loire region, and adapted new species

An analysis of the harvesting equipment and human resources necessary for wood chip production was carried out by stand type based on the Arbocentre and FCBA databases. The study was based on 236 questionnaires sent to companies in the wood-products sector. At the same time, an environmental study focused on the sensitivity of soils to whole tree harvesting, at more than 4,300 sites in the National Forest Inventory (IGN) network and at 11 harvesting sites. We carried out technical, economic and environmental monitoring. We characterized volumes, species, soils, biodiversity before and after cutting, and quantified the nutrients exported to assess the impact of whole tree harvesting on soil fertility and biodiversity. This work complements the INSENSE and GERBOISE projects at the national scale.

A parallel bibliographic analysis and overview of trials carried out in different French arboretums, linked to the ESPERANCE project, made it possible to establish the vulnerability of various tree species to climate change by forest region in France. This resulted in a list of species to test.

Main results:

Fuel-wood provenance: Forty percent of the chips for fuel-wood boilers comes from coppices being converted into even-aged stands, 30% from the harvest of young coppices, and 30% from maintenance operations or harvesting woody debris.

Soils: Regional soils are mainly poor and acidic, highly deficient in phosphorus (P), potassium (K) and magnesium (Mg). Harvesting whole trees doubles nutrient exports. Associated with the export of woody debris and leaves, this practice can lead to fertility loss in these already poor soils. The practice also removes habitats that support biodiversity.

Economy: The economically important forest species in the Center region are particularly vulnerable to expected climate change. Scots pine and pedunculate oak are threatened. The more resilient sessile oak should be favored. After harvesting, we recommend installing plantations of species adapted to the soil and to future climatic conditions, while maintaining a forested atmosphere supportive of biodiversity.

Communication and deliverables:

Nineteen public meetings were held to present the dynamic forest management and how it contributes to some forest ecosystem services, sequester (or store) carbon and replace fossil energy by providing fuel-wood.

A sensitivity map for the forest soils in the Center region was drawn up and 52 adapted trees species have been proposed. Specification sheets for setting up comparative plantations have been created. Several scientific and technical articles have been submitted for publication. Harvesting recommendations and a decision support tool for site-specific management have been formulated.

DEFIFORBOIS, coordinated by INRAE in the Center-Val de Loire region in collaboration with FCBA, ONF, CNPF, Unisylva and Arbocentre, began in January 2016 and will end in December 2020.