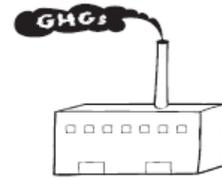


# ENVIRONMENTAL FOOTPRINT COMPARISON TOOL

*A tool for understanding environmental decisions related to the pulp and paper industry*



GREENHOUSE GASES

## EFFECTS OF NON-WOOD FIBER USE ON GREENHOUSE GAS EMISSIONS

### Effects of Land Use Change

As a generalization, croplands store less carbon than grasslands, which store less carbon than forests. Changes in the atmospheric burden of greenhouse gases will depend upon changes in land use, in part due to differing “equilibrium” levels for soil carbon storage associated with the various land uses.

In cropland ecosystems, carbon stocks are primarily in the form of below-ground plant organic matter and soil. Portions of that soil carbon are lost as a consequence of soil disturbance. Tillage increases aeration and soil temperatures, rendering the soil aggregates more susceptible to breakdown and otherwise physically protected organic material more amenable to breakdown. Any accompanying soil erosion reduces soil productivity and its associated capacity to support carbon fixation and storage. Many agricultural soils, due to repeated cultivation, are net sources of carbon releases to the atmosphere. These impacts can, however, be reduced with the practice of low or no till cultivation.

By far, most of the carbon stocks in rangelands and pasture (grasslands) are found in subsoil. These carbon stocks exceed those associated with croplands and are stable over extended periods of time. Once exposed to the disturbances accompanying conversion to cropland, these stocks diminish over time to a lower equilibrium level inherent with cropland management. That loss becomes an addition to the atmospheric CO<sub>2</sub> burden (Watson et al. 2000).

Landowners can be expected to allocate land to the use they expect will yield the greatest benefit over time. Low quality land will find its greatest use for crops that do not derive benefit from land of higher quality. Higher quality land is naturally used for agriculture, and lower quality land is used for forestry.

Increasing pressure upon agricultural land resources could lead to greater cultivation of more marginal range and pasture land, with the potential for an accompanying incremental increase in the atmospheric burden of greenhouse gases.

### Reference

Watson R.T., Noble I. R., Bolin A., Ravindranath N.H., Verardo, D J., and Dokken, D J. 2000. *Land use, land-use change, and forestry*. Intergovernmental Panel on Climate Change Special Report. New York: Cambridge University Press.