



## environment, forestry & fisheries

Department:  
Environment, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA

### Box C.9. Annual change in Carbon stocks in DOM due to land use conversion: from Afforestation to Deforestation

Sheet Land Stock-Difference method in the MRV tool; column  $\Delta C$  DOM

#### Sheet Supporting calculations

If 10 ha of *Pinus patula* in climatic zone warm temperate in afforested lands are deforested before reaching 10 years after establishment of the 1<sup>st</sup> rotation (e.g. at 3 years) then the DOM stock change is:

C in DOM (equilibrium value for specific continuous forest plantation): 20.3 t C ha<sup>-1</sup> (for Needle leaf evergreen, IPCC 2006, volume 4, chapter 2, Table 2.2, Climate: Warm temperate)

C in DOM in non-forest land: 0 t C ha<sup>-1</sup> (IPCC 2006 Tier 1 assumption)

$$\Delta C_{DOM} = ((0 \text{ t C ha}^{-1} - 20.03 \text{ t C ha}^{-1})/20 \text{ years}) \times 3 \text{ years} \times 10 \text{ ha} = - 30.45 \text{ t C yr}^{-1}$$

#### C.3.2.4. Soil Organic Carbon, $\Delta SOC$

In line with the Accounting Rulebook, for the estimates of carbon stock change in Dead Organic Matter pool (dead wood and litter) the following has been assumed:

- there is no change in SOC pool in Forest management, therefore carbon stock change in SOC is only estimated in the case of Afforestation and Deforestation.
- SOC stock changes associated with Deforestation generally occurs for a period after deforested. However, SOC emissions or removals shall not be reported or accounted because other land uses are not included in the 2019 Carbon Tax Act.
- Therefore, carbon stock change in SOC is only reported when Afforestation occurs and for Forest Management, if Tier 2 or Tier 3 methodologies are applied.
- If afforestation occurs, the default Tier 1 assumption is that afforested areas accumulate SOC for the first 20 years. After 20-years of the rotation, SOC reaches an equilibrium value.

#### Calculation method in the MRV tool

Since it is assumed that the carbon stock in the SOM pool only changes in the case of Afforestation or Deforestation activities, the IPCC 2006 method for Land conversions is used.

$$\Delta C_{Mineral} = \frac{(SOC_0 - SOC_{(0-t)})}{D}$$

$$SOC = \sum_{c,i,j} (SOC_{REF_{c,s,j}} \times F_{LU_{c,s,j}} \times F_{MG_{c,s,j}} \times F_{I_{c,s,j}})$$

Equation C.8

Note: *T* is used in place of *D* in this equation if *T* is  $\geq 20$  years

Where:

- $\Delta C_{Mineral}$  = annual change in carbon stocks in mineral soils, t C yr<sup>-1</sup>