



## environment, forestry & fisheries

Department:  
Environment, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA

### Calculation method in the MRV tool

The calculations for emissions from applied fertiliser ( $S_{fert}$ ) are based on the IPCC 2006 Tier 1 methodology (volume 4, chapter 11). Emissions from fertiliser are calculated based on the following equations (see Box C.16 for example):

$$N_2O_{Direct-N} = N_2O-N_{N\ inputs} \quad \text{Equation C.18}$$

$$N_2O-N_{N\ inputs} = F_{SN} \times EF_N \quad \text{Equation C.19}$$

Where:

$N_2O\ Direct-N$  = annual direct  $N_2O-N$  emissions produced from managed soils,  $kg\ N_2O-N\ yr^{-1}$  (N which is available for conversion to  $N_2O$ )

- $N_2O-N\ inputs$  = annual direct  $N_2O-N$  emissions from N inputs to managed soils,  $kg\ N_2O-N\ yr^{-1}$
- $F_{SN}$  = annual amount of synthetic fertiliser N applied to soils,  $kg\ N\ yr^{-1}$ 
  - $F_{SN} = F_{TOTAL} \times Fraction_N$ ,
  - where  $F_{TOTAL}$  = Total fertiliser applied (kg), Fraction N = the fraction of N in fertiliser
- $EF_N$  = emission factor for  $N_2O$  emissions from N inputs ( $0.01\ t\ N_2O-N\ tN^{-1}$ )

Conversion of  $N_2O-N$  emissions to  $N_2O$  emissions for reporting purposes is performed by using the following equation:

$$N_2O = N_2O - N \times \frac{44}{28}$$

Emissions of  $CH_4$  and  $N_2O$  are converted to  $CO_2eq$  applying GWP of IPCC third assessment report (TAR).

#### Box C.16. Emission estimates due to Synthetic fertiliser application

##### Sheet Fertilisation in the MRV tool

$N_2O$  emissions due to the application of 10,000 kg of N synthetic fertilisers in a forest plantation are:

$$F_{SN} = 10,000\ kg\ N$$

$$EF_N = 0.01\ kg\ N_2O - N\ (kg\ N)^{-1}\ (\text{default IPCC 2006})$$

$$N_2O-N_{N\ inputs} = 10,000\ kg\ N \times 0.01\ kg\ N_2O-N\ (kg\ N)^{-1} = 100\ kg$$

$$N_2O\ emissions = 100 \times \frac{44}{28} \times 10^{-3} = 0.16\ t$$

$$CO_2eq\ emissions = 0.16 \times 296 = 46.5\ t\ CO_2eq$$