SEG emisiju aprēķina funkcionālais projektējums augkopības saimniecībām

Ieejas dati (input)

Dati par kultūraugu sējumu platību (ha) un ražību (t/ha)

Kvieši
Mieži
Auzas
Rudzi
Tritikāle
Griķi
Pārējie graudaugi
Rapši
Pākšaugi
Kartupeļi
Dārzeņi
Kukurūza zaļbarībai un skābbarībai
Graudaugi un pākšaugi zaļbarībai un skābbai
Aramzemē sētie ilggadīgie zālāji (platība)

Dati par minerālmēslu un kaļķošanas materiālu lietošanu (kg)

N, tīrvielā
Karbamīds
Kaļķis
Dolomīts

Izejas dati (output): Emisijas

Kopā, tonnas CO_2 ekviv.
No minerālmēslu lietošanas, tonnas CO_2 ekviv.
No augu atlekām, tonnas CO_2 ekviv.
No karbamīda, tonnas CO_2 ekviv.
No kaļķošanas, tonnas CO_2 ekviv.

Noklusējuma vērtības (default)

Augu ražība un minerālmēslu lietošana

Kultūraugs	Ražība, t/ha	Iestrādātais minerālmēslu daudzums, N tīrvielā kg/ha	DRY (sausnas daļa)
kvieši	5.85	159	0.86
mieži	4.2	87	0.86
auzas	3.8	84	0.86
rudzi	5.5	107	0.86
tritikāle	5.8	138	0.86
griķi	1.2	16	0.86
pārējie graudaugi	1.2	16	0.86
rapši	2.5	172	0.92
pāksaugi	5	45	0.86
kartupeļi	19	48	0.22
dārzeņi	17.7	38	0.12
kukuruza zaļbarībai un skābbarībai	35	165	0.4
pārējās zaļbarības un skābbarības kultūras	32	45	0.3
aramzemē sētie zālāji	5.2 (siens)	45	0.84

Balstīts uz LLKC (brutto seguma aprēķini), CSP, NIR

N2O no augsnes apsaimniekošanas

Tiešās N2O emisijas

N_2O emisijas CO_2 ekvivalentā ← X298

N_2O emisijas CO_2 ekvivalentā ← X298

N2O no minerālmēslu iestrādes augsnē

Equation 11.1(modified)

DIRECT N_2O EMISSIONS FROM MANAGED SOILS

$$N_2O_{direct\ SN} = F_{SN} \cdot EF_1 \cdot \frac{44}{28}$$

Where:

$N_2O_{direct\ SN}$ = annual direct N_2O emissions produced from synthetic fertilizers, kg N_2O yr^{-1}

F_{SN} = annual amount of synthetic fertiliser N applied to soils, kg, N yr^{-1}

EF_1 = emission factor for N_2O emissions from N inputs kg N_2O–N (kg N input)$^{-1}$ (Table 11.1)

EF_1 = 0.016 →

Table 11.1 (Updated)
Default emission factors to estimate direct N_2O emissions from managed soils

Emission factor	Aggregated		Disaggregated		
	Default value	Uncertainty range	Disaggregation[4]	Default value	Uncertainty range
EF_1 for N additions from synthetic fertilisers, organic amendments and crop residues, and N mineralised from mineral soil as a result of loss of soil carbon[1] [kg N_2O–N (kg $N)^{-1}$]	0.010	0.001 – 0.018	Synthetic fertiliser inputs[5] in wet climates	0.016	0.013 – 0.019
			Other N inputs[6] in wet climates	0.006	0.001 – 0.011
			All N inputs in dry climates	0.005	0.000 – 0.011
EF_{1FR} for flooded rice fields[2,7] [kg N_2O–N (kg $N)^{-1}$]	0.004	0.000 – 0.029	Continuous flooding	0.003	0.000 – 0.010
			Single and multiple drainage	0.005	0.000 – 0.016
$EF_{1PRP,CPP}$ for cattle (dairy, non-dairy and buffalo), poultry and pigs[3] [kg N_2O–N (kg $N)^{-1}$]	0.004	0.000– 0.014	Wet climates	0.006	0.000 – 0.026
			Dry climates	0.002	0.000 – 0.006
$EF_{1PRP,SO}$ for sheep and 'other animals'[3] [kg N_2O–N (kg $N)^{-1}$]	0.003	0.000 – 0.010	-	-	-

Sources:
[1] Stehfest & Bouwman 2006; van Lent et al. 2015; Grace et al. 2016; van der Weerden et al. 2016; Albanito et al. 2017; Cayuela et al. 2017; Liu et al. 2017; Rochette et al. 2018.
[2] Akiyama et al. 2005; Albanito et al. 2017; Cayuela et al. 2017.
[3] Yamulki et al. 1998; Galbally et al. 2000; Liebig et al. 2008; Cai & Akiyama 2016; Cardenas et al. 2016; Di et al. 2016; Hoogendoorn et al. 2016; Hyde et al. 2016; Krol et al. 2016; Li et al. 2016; Luo et al. 2016; Marsden et al. 2016; Misselbrook et al. 2016; Nichols et al. 2016; O'Connor et al. 2016; Owens et al. 2016; Pelster et al. 2016; Ward et al. 2016; Halvorr et al. 2017; Byrnes et al. 2017; Forrestal et al. 2017; Marsden et al. 2017; Owens et al. 2017; Thomas et al. 2017a, b; Tully et al. 2017; van der Weerden et al. 2017; Cardoso et al. 2018; Chadwick et al. 2018; Nichols et al. 2018.
Notes:
EF_1: Uncertainty range of disaggregated EF_1 based on the 95% confidence interval of fitted values. Uncertainty range of aggregated EF_1 is based on the 2.5th to 97.5th percentile of the dataset (See methods, data and results in Annex 11A.2).
EF_{1FR}: Uncertainty range is based on the 2.5th to 97.5th percentile (See methods and data in Annex 11A.3).
$EF_{1PRP,CPP}$ and $EF_{1PRP,SO}$: Uncertainty range is based on the 2.5th to 97.5th percentile (See methods and data in Annex 11A.4).
For EF_1, see guidance in *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*: Wetlands, Chapter 2, Table 2.5.
[4] Disaggregation of EF_1 and $EF_{1PRP,CPP}$ by climate (based on long-term averages): Wet climates occur in temperate and boreal zones where the ratio of annual precipitation: potential evapotranspiration > 1, and tropical zones where annual precipitation > 1000 mm. Dry climate occur in temperate and boreal zones where the ratio of annual precipitation: potential evapotranspiration < 1, and tropical zones where annual precipitation < 1000 mm (cf. Figure 3.A.5.1 in Chapter 3 of Vol. 4 provides a map subdividing wet and dry climates based on these criteria). In wet climates, the EF_1 is further disaggregated by synthetic fertiliser N inputs and other N inputs.
[5] This emission factor should be used for synthetic fertiliser applications, and fertiliser mixtures that include both synthetic and organic forms of N.
[6] Other N input refers to organic amendments, animal manures (e.g. slurries, digested manures), N in crop residues and mineralised N from soil organic matter decomposition.
[7] Disaggregation of EF_{1FR}: Single and multiple drainage also include alternate wetting and drying. Disaggregated EF_{1FR} for rain-fed and deep-water systems not provided due to lack of data. The EF_1 should be used for upland rice.

N2O no ražas atliekām

Equation 11.1 (modified)

DIRECT N_2O EMISSIONS FROM MANAGED SOILS

$$N_2O_{direct\ CR} = F_{CR} \cdot EF_1 \cdot \frac{44}{28}$$

Where:

$N_2O_{direct\ CR}$ = annual direct N_2O emissions produced from crop residues, kg N_2O yr^{-1}

F_{CR} = annual amount of N in crop residues (above-ground and below-ground), including N-fixing crops, and from forage/pasture renewal, returned to soils, kg, N yr^{-1}

EF_1 = emission factor for N_2O emissions from N inputs kg N_2O–N (kg N input)$^{-1}$ (Table 11.1)

F_{CR} → EF_1 = 0.006 →

Equation 11.6 (Updated)
N from crop residues and forage/pasture renewal (Tier 1)

$$F_{CR} = \sum_T \left[\left[AGR_{(T)} \bullet N_{AG(T)} \bullet \left(1 - Frac_{Burn(T)} - \left(Frac_{Burn(T)} \bullet C_f\right)\right) \right] + \left[BGR_{(T)} \bullet N_{BG(T)} \right] \right]$$

$$N_2O_{AT(T)} = N_2O_{AT(T)} - N \bullet 44/28$$

$$BGR_T = \left(Crop_{(T)} \bullet AG_{DM(T)}\right) \bullet RS_{(T)} \bullet Area_{(T)} \bullet Frac_{Renew(T)}$$

$$AG_{DM(T)} = Crop_{(T)} \bullet R_{AG(T)}$$

$$AGR_T = Crop_{(T)} \cdot R_{AG(T)} \cdot Area_{(T)} \cdot Frac_{Renew(T)}$$

Where:

F_{CR} = annual amount of N in crop residues (above and below ground), including N-fixing crops, and from forage/pasture renewal, returned to soils annually, kg N yr^{-1}

$AGR_{(T)}$ = annual total amount of above-ground crop residue for crop T, kg d.m. yr^{-1}.

$N_{AG(T)}$ = N content of above-ground residues for crop T, kg N (kg d.m.)$^{-1}$ (Table 11.1a)

$Frac_{Burn(T)}$ = fraction of above-ground residues of crop T removed annually for purposes such as feed, bedding and construction, dimensionless. Survey of experts in country is required to obtain data. If data for $Frac_{Burn}$ are not available, assume no removal

$Frac_{Burn(T)}$ = fraction of annual harvested area of crop T burnt, dimensionless

C_f = combustion factor (dimensionless) (refer to Chapter 2, Table 2.6)

$BGR_{(T)}$ = annual total amount of belowground crop residue for crop T, kg d.m. yr^{-1}

$N_{BG(T)}$ = N content of below-ground residues for crop T, kg N (kg d.m.)$^{-1}$, (Table 11.1a)

$AG_{DM(T)}$ = Above-ground residue dry matter for crop T, kg d.m. ha^{-1}

(Use factors for $R_{AG(T)}$ in Table 11.1a, or alternatively, $AG_{DM(T)}$ may be estimated using the method and data in Table 11.2)

$Crop_{(T)}$ = harvested annual dry matter yield for crop T, kg d.m. ha^{-1}

$R_{AG(T)}$ = ratio of above-ground residue dry matter to harvested yield for crop T ($Crop_{(T)}$), kg d.m. ha^{-1} (kg d.m. $ha^{-1})^{-1}$, (Table 11.1a)

$Area_{(T)}$ = total annual area harvested of crop T, ha yr^{-1}

$Frac_{Renew(T)}$ = fraction of total area under crop T that is renewed annually [15], dimensionless. For countries where pastures are renewed on average every X years, $Frac_{Renew}$ = 1/X. For annual crops $Frac_{Renew}$ = 1

$RS_{(T)}$ = ratio of below-ground root biomass to above-ground shoot biomass for crop T, kg d.m.ha^{-1} (kg d.m. $ha^{-1})^{-1}$, (Table 11.1a)

T = crop or forage type

$Crop_{(T)}$ ↑

Equation 11.7
Dry-weight correction of reported crop yields

$$Crop_{(T)} = Yield\ Fresh_{(T)} \bullet DRY$$

Where:

$Crop_{(T)}$ = harvested dry matter yield for crop T, kg d.m. ha^{-1}

$Yield\ Fresh_{(T)}$ = harvested fresh yield for crop T, kg fresh weight ha^{-1}

DRY = dry matter fraction of harvested crop T, kg d.m. (kg fresh weight)$^{-1}$

Table 11.1a (New)
Default values for $N_{AG(T)}$, $N_{BG(T)}$, $R_{AG(T)}$, $R_{BG(T)}$ and DRY to be used in Equations 11.6 and 11.7

Crops	N content of above-ground residues ($N_{AG(T)}$)[a]	N content of below-ground residues ($N_{BG(T)}$)[b]	Ratio of above-ground residue dry matter to harvested yield ($R_{AG(T)}$)[c]	Ratio of below-ground biomass to above-ground biomass ($RS_{(T)}$)[d]	Dry matter fraction of harvested product (DRY)[e]
Crops					
Generic value for crops not indicated below[f]	0.008 (± 75%)[g]	0.009 (± 75%)[g]	1.0	0.22	0.85
Generic Grains	0.006 (± 75%)[g]	0.009 (± 75%)[g]	1.3	0.22 (±10%)	0.88
Winter Wheat	0.006 (± 75%)[g]	0.009 (± 75%)[g]	1.3	0.23 (±41%)	0.89
Spring Wheat	0.006 (± 75%)[g]	0.009 (± 75%)[g]	1.3	0.28 (±26%)	0.89
Barley	0.007 (± 75%)[g]	0.010 (± 75%)[g]	1.2	0.22 (± 35%)	0.89
Oats	0.007 (± 75%)[g]	0.008 (± 75%)[g]	1.3	0.25 (± 120%)	0.89
Maize	0.006 (± 75%)[g]	0.007 (± 75%)[g]	1.0	0.22 (± 26%)	0.87
Rye	0.005 (± 75%)[g]	0.011 (± 75%)[g]	1.6	-[e]	0.88
Rice	0.007 (± 75%)[g]	-[e]	1.4	0.16 (± 35%)	0.89
Millet	0.007 (± 75%)[g]	-[e]	1.4	-[e]	0.90
Sorghum	0.007 (± 75%)[g]	0.006 (± 75%)[g]	1.4	-[e]	0.89
Beans and Pulses	0.008 (± 75%)[g]	0.008 (± 75%)[g]	2.1	0.19 (± 45%)	0.91
Soybeans	0.008 (± 75%)[g]	0.008 (± 75%)[g]	2.1	0.19 (± 45%)	0.91
Potatoes and Tubers	0.019 (± 75%)[g]	0.014 (± 75%)[g]	0.4	0.20 (± 50%)[g]	0.22
Peanuts	0.016 (± 75%)[g]	-[e]	1.0	-[e]	0.94
Grasses and Forages					
Alfalfa	0.027 (± 75%)[g]	0.019 (± 75%)[g]	-[e]	0.40 (± 50%)[g]	0.90
Non-legume hay	0.015 (± 75%)[g]	0.012 (± 75%)[g]	-[e]	0.54 (± 50%)[g]	0.90
N-fixing forages	0.027 (± 75%)[g]	0.022 (± 75%)[g]	0.3	0.40 (± 50%)	0.90
Non-N-fixing forages	0.015 (± 75%)[g]	0.012 (± 75%)[g]	0.3	0.54 (± 50%)	0.90
Perennial Grasses	0.015 (± 75%)[g]	0.012 (± 75%)[g]	0.3	0.80 (± 50%)h	0.90
Grass-Clover Mixtures	0.025 (± 75%)[g]	0.016 (± 75%)[g]	0.3	0.80 (± 50%)[g]	0.90

Sources:
a Literature review by Stephen A. Williams, Natural Resource Ecology Laboratory, Colorado State University. A list of the original references is given in Annex 11A.1.
b 2006 IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories. Chapter 4 for R AGT) and default values for root-shoot ratios, which are from the 2006 IPCC Guidelines, Chapter 11, and the generic value for all crops, which is the output of experts of authors.
Notes:
c It is assumed here that grass dominates the system by 2 to 1 over legumes.
d No uncertainty is provided in the original study. This uncertainty is expert-based judgment.
e No estimate is available. The most appropriate generic value can be used based on expert judgment, in absence of more specific information available to develop a country-specific value.
f This is an estimate of non-tuber roots based on the root:shoot values found for other crops. If unmarketable tuber yield is returned to the soil then data are derived from Vangeyel & Renner 1990 (see Annex 11A.1) (unmarketable yield = 0.08 * marketable yield + 0.29 * above-ground biomass) suggest that the total residues returned might then be on the order of 0.08 * above-ground biomass. Default v.d.
g This is an estimate of root turnover in perennial systems. Default v.d.
h Estimate of root turnover to above-ground production based on the assumption that in natural grass systems below-ground biomass is approximately equal to twice (one to three times) the above-ground biomass and that root turnover in these systems averages about 40% (50% to 50%) per year. Default v.d.

Netiešās N2O emisijas

N_2O emisijas CO_2 ekvivalentā ← X298

N_2O emisijas CO_2 ekvivalentā ← X298

N2O no minerālmēslu iestrādes augsnē

No iztvaikošanas

Equation 11.9 (modified)

N_2O FROM ATMOSPHERIC DEPOSITION OF N VOLATILISED FROM MANAGED SOILS (TIER 2)

$$N_2O_{(ATD,SN)} = F_{SN} \cdot \mathrm{Frac}_{GASM} \cdot EF_4 \cdot \frac{44}{28}$$

Where:

$N_2O_{(ATD,SN)}$ = annual amount of N_2O produced from atmospheric deposition of N volatilised from managed soils, kg N_2O yr-1

F_{SN} = annual amount of synthetic fertilizer N applied to soils, kg yr^{-1}

Frac_{GASM} = fraction of synthetic fertiliser N that volatilises as NH_3 and NO_x, kg N volatilised (kg of N applied)$^{-1}$

EF_4 = emission factor for N_2O emissions from atmospheric deposition of N on soils and water surfaces, [kg N–N_2O (kg NH_3–N + NO_x–N volatilized)$^{-1}$] (Table 11.3)

Frac_{GASM} = 0.11 →
EF4 = 0.014 →

No izskalošanās

Equation 11.10 (modified)

N_2O FROM N LEACHING/RUNOFF FROM MANAGED SOILS IN REGIONS WHERE LEACHING/RUNOFF OCCURS (TIER 1)

$$N_2O_{(L,SN)} = F_{SN} \cdot \mathrm{Frac}_{LEACH(-H)} \cdot EF_5 \cdot \frac{44}{28}$$

Where:

$N_2O_{(L,SN)}$ = annual amount of N_2O produced from leaching and runoff of N additions to managed soils in regions where leaching/runoff occurs, kg N_2O yr-1

F_{SN} = annual amount of synthetic fertilizer N applied to soils in regions where leaching/runoff occurs, kg N yr-1

$\mathrm{Frac}_{LEACH(-H)}$ = fraction of all N added to/mineralised in managed soils in regions where leaching/runoff occurs that is lost through leaching and runoff, kg N (kg of N additions)-1 (Table 11.3)

EF_5 = emission factor for N2O emissions from N leaching and runoff, kg N_2O–N (kg N leached and runoff)-1 (Table 11.3)

EF5 = 0.011 →

Frac_{LEACH} = 0.23 ↑

Balstīts uz NIR

Table 11.3 (Updated)
Default emission, volatilisation and leaching factors for indirect soil N_2O emissions

Emission factor	Aggregated		Disaggregated		
	Default value	Uncertainty range	Disaggregation	Default value	Uncertainty range
EF_4 [N volatilisation and re-deposition][7], kg N_2O–N (kg NH_3–N + NO_x–N volatilised)$^{-1}$ [8]	0.010	0.002 - 0.018	Wet climate	0.014	0.011 – 0.017
			Dry climate	0.005	0.000 – 0.011
EF_5 [leaching/runoff][7], kg N_2O–N (kg N leaching/runoff)$^{-1}$	0.011	0.000 - 0.020	-	-	-
Frac_{GASF} [Volatilisation from synthetic fertiliser][7], (kg NH_3–N + NO_x–N) (kg N applied)$^{-1}$	0.11	0.02 - 0.33	Urea	0.15	0.03 – 0.43
			Ammonium-based	0.08	0.02 – 0.30
			Nitrate-based	0.01	0.00 – 0.02
			Ammonium-nitrate-based	0.05	0.00 – 0.20
Frac_{GASM} [Volatilisation from all organic N fertilisers applied, and dung and urine deposited by grazing animals][8], (kg NH_3–N + NO_x–N) (kg N applied or deposited)$^{-1}$	0.21	0.00 - 0.31	-	-	-
$\mathrm{Frac}_{LEACH-(H)}$ [N losses by leaching/runoff in wet climates][9], kg N (kg N additions or deposition by grazing animals)$^{-1}$	0.24	0.01 – 0.73	-	-	-

Sources:
[7] Stehfest & Bouwman 2006; van Lent et al. 2015; Grace et al. 2016; van der Weerden et al. 2016; Albanito et al. 2017; Cayuela et al. 2017; Liu et al. 2017; Rochette et al. 2018.
[8] Tian et al. 2019.
[9] NH_3: Bouwman et al. 2002; Pan et al. 2016. NO_x Liu et al. 2017.
[9] NH_3: Bouwman et al. 2002; Cai & Akiyama 2016. NO_x Liu et al. 2017.
[9] Reviews: Di & Cameron 2002; Cai & Akiyama 2016. Original papers: Moreno et al. 1996; Díez et al. 1997; Catt et al. 1998; Sogbedji et al. 2000; Asadi et al. 2002; Roadman et al. 2002; Ren et al. 2003; Dusdeo & Quiñz 2004; Dusdeo et al. 2004; Díez et al. 2004; Bakhsh et al. 2005; Basso & Ritchie 2005; Gehl et al. 2005; Fang et al. 2006; Li et al. 2006; Díez-Lopez et al. 2008; Conrad & Fohrer 2009; Zhu et al. 2009; Aronsson & Stenberg 2010; Bakhsh et al. 2010; Salmeron et al. 2010; Yagoe & Quiñz 2010; Claret et al. 2011; Huang et al. 2011; Gallojones et al. 2012; Perego et al. 2012; Sorensen & Rubæk 2012; Tafteh & Sepaskhah 2012; Wang et al. 2012.
Notes:
Disaggregation by climate for EF_4 and $\mathrm{Frac}_{LEACH-(H)}$ (based on long-term averages): Wet climates occur in temperate and boreal zones where the ratio of annual precipitation: potential evapotranspiration > 1, and tropical zones where annual precipitation > 1000 mm. Dry climates occur in temperate and boreal zones where the ratio of annual precipitation: potential evapotranspiration < 1, and tropical zones where annual precipitation < 1000 mm (cf. Figure 3.A.5.1 in Chapter 3 of Vol. 4.
EF_4: The aggregated EF_4 is the same as the aggregated EF_1 (see Annex 11A.5). The disaggregated EF_4 are the same as the EF_1 disaggregated by wet and dry climates (see Table A2-1 in Annex11A.2). Uncertainty range of the aggregated EF_4 is based on the 2.5th to 97.5th percentile of the dataset, uncertainty range of disaggregated EF_4 is based on the 95% confidence interval of fitted values (See methods and data in Annex 11A.2).
EF_5: This emission factor incorporates three components: $EF_5 = EF_{5g} + EF_{5r} + EF_{5e}$. EF_{5g}: Emission factor for groundwater and surface drainage, including upstream supersaturated with N_2O (N_2O emitted mainly from degassing of groundwater); EF_{5r}: Emission factor for rivers and reservoirs, including downstream (supersaturated N_2O was already degassed and N_2O mainly produced by nitrification/denitrification in situ); EF_{5e}: Emission factor for estuaries. See methods in Annex 11A.6. Uncertainty range is based on the 2.5th to 97.5th percentile.
Frac_{GASF}: Calculated by weighting world fertiliser usage with number of observations from review papers (See methods and data in Annex 11A.7). Uncertainty range based on the 2.5th to 97.5th percentile.
Frac_{GASM}: See methods in Annex 11A.8. Uncertainty range is based on the 2.5th to 97.5th percentile.
$\mathrm{Frac}_{LEACH-(H)}$: The $\mathrm{Frac}_{LEACH-(H)}$ only applies to wet climates. For dry climate, the default $\mathrm{Frac}_{LEACH-(H)}$ is taken as zero. See methods in Annex 11A.9. Uncertainty range is based on the 2.5th to 97.5th percentile.
For Tier 2, country specific $\mathrm{Frac}_{LEACH-(H)}$ can be estimated for N losses by leaching/runoff for regions where $\Sigma(\mathrm{rain}) - \Sigma(ET_c) > \mathrm{soil\ water\ holding\ capacity}$, OR where irrigation (except drip irrigation) is used. $ET_c = Kpan * Ep$, where ET_c: reference evapotranspiration, Kpan: pan evaporation coefficient, Ep: pan evaporatio n. When Kpan is not available, reference evaporation can be estimated as $ET_0 = 0.5 * Ep$ (Explanations of reference and pan evaporation: see Allen et al.,1998). Long-term mean of annual rainfall data should be used for estimating $\mathrm{Frac}_{LEACH-(H)}$. Precipitation and potential evapotranspiration data are available from global datasets, such as the CRU climate dataset (https://crudata.uea.ac.uk/cru/data/hrg/), if country-specific data are not available.

N2O no ražas atliekām

No izskalošanās

Equation 11.10 (modified)

N_2O FROM N LEACHING/RUNOFF FROM MANAGED SOILS IN REGIONS WHERE LEACHING/RUNOFF OCCURS (TIER 1)

$$N_2O_{(L,CR)} = F_{CR} \cdot \mathrm{Frac}_{LEACH(-H)} \cdot EF_5 \cdot \frac{44}{28}$$

Where:

$N_2O_{(L,CR)}$ = annual amount of N_2O produced from leaching and runoff of N additions to managed soils in regions where leaching/runoff occurs, kg N_2O yr-1

F_{CR} = amount of N in crop residues (above- and below-ground), including N-fixing crops, and from forage/pasture renewal, returned to soils annually in regions where leaching/runoff occurs, kg yr^{-1}

$\mathrm{Frac}_{LEACH(-H)}$ = fraction of all N added to/mineralised in managed soils in regions where leaching/runoff occurs that is lost through leaching and runoff, kg N (kg of N additions)-1 (Table 11.3)

EF_5 = emission factor for N2O emissions from N leaching and runoff, kg N_2O–N (kg N leached and runoff)-1 (Table 11.3)

EF5 = 0.011 →

Frac_{LEACH} = 0.23 ↑

Balstīts uz NIR

CO2 emisijas no augsnes apsaimniekošanas

CO2 emisijas no karbamīda izmantošanas

Equation 11.13
Annual CO_2 emissions from urea application

$$CO_2\text{–}C\ Emission = M \bullet EF \quad \times \frac{44}{12}$$

Where:

CO_2–C Emission = annual C emissions from urea application, tonnes C yr^{-1}

M = annual amount of urea fertilisation, tonnes urea yr^{-1}

EF = emission factor, tonne of C (tonne of urea)$^{-1}$ **EF = 0.2**

CO2 emisijas no augsnes kaļķošanas

Equation 11.12
Annual CO_2 emissions from lime application

$$CO_2\text{–}C\ Emission = \left(M_{Limestone} \bullet EF_{Limestone}\right) + \left(M_{Dolomite} \bullet EF_{Dolomite}\right) \quad \times \frac{44}{12}$$

Where:

CO_2–C Emission = annual C emissions from lime application, tonnes C yr^{-1}

M = annual amount of calcic limestone ($CaCO_3$) or dolomite ($CaMg(CO_3)_2$), tonnes yr^{-1}

EF = emission factor, tonne of C (tonne of limestone or dolomite)$^{-1}$ **EF = 0.12 (limestone), 0.13 (dolomite)**