2040 climate target: methodological note on modelling of non-CO2 GHG emissions in the agriculture sector

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This note was authored by the European Commission. It complements the analysis on the agriculture sector provided in the Impact Assessment[1] accompanying the 2040 climate target Communication[2]. It also complements the additional information on technology assumptions used in the analysis that has been published on the European Commission's website[3]. The note gives further details on the agricultural system (food diet, productions), on how the IED proposal is reflected in the modelling, and on non-CO2 GHG mitigation options in the sector. Note that a detailed description of the modelling tools used in the impact assessment is available on the European Commission's website[4].

1. Further details on food diets and agricultural production

Table 1 shows the assumed calory intake per capita in 2040 in the three core scenarios (S1, S2, S3) and in the LIFE variant.

Table 1: Assumed evolution of EU calory intake per capita.

Calories/capita and day	2020	2040 S1-S3	2040 LIFE
Cereals and rice	514	515	577
Oilseeds	12	16	29
Oilseed oil	262	250	251
Milk and dairy products	362	382	337
Beef meat	48	45	35
Other meat	259	258	210
Other calories	657	644	669
Total caloric intake	2115	2109	2108

Source: CAPRI

Note: The category "other calories" includes vegetables and permanent crops, sugar, coffee, teas and cocoa, fish and other aquatic products, other oils, and other arable field crops.

The total intake per capita remains overall stable compared to 2020 in all scenarios and in the LIFE variant.

The distribution across products in scenarios S1, S2 and S3 remains fairly close to the 2020 composition. The LIFE variant displays a different pattern, assuming a partial development (25% in 2040) of the healthy

[1] SWD(2024) 63.
[2] COM(2024) 63.
[3] https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2040-climate-target_en
[4] https://climate.ec.europa.eu/eu-action/climate-strategies-targets/economic-analysis/modelling-tools-eu-analysis_en

diet as proposed by the EAT-Lancet Commission[5, 6]: a lower consumption of dairy products and meat is compensated by a larger consumption of cereals, oilseeds and vegetables.

Table 2 and Table 3 show the assumptions used in the analysis on the productions in agriculture in the three core scenarios (S1, S2, S3) and in the LIFE variant. Table 2 corresponds to and complements Table 24 of Annex 8 of the 2040 climate target impact assessment[7]. Table 3 corresponds to and complements Table 22 of Annex 8 of the 2040 climate target impact assessment.

Table 2: EU production of agricultural products.

[in Mt]	2020	2040	
		S1, S2, S3	LIFE
Cereals	274	268	215
of which wheat	*123*	*118*	*98*
Vegetables and Permanent crops	124	126	123
Oils & oilseeds	51	59	55
Other arable field crops	47	39	34
Meat	43	45	34
Raw milk, eggs	151	169	152
Dairy products	60	64	57

Source: CAPRI

Table 3: Livestock population in the EU.

[in Million LSU]	2020	2040	
		S1, S2, S3	LIFE
Cattle	54.4	51.1	37.0
of which dairy cows	*20.9*	*19.2*	*17.3*
of which suckler cows	*9.4*	*8.9*	*3.2*
of which other cattle	*24.0*	*23.1*	*16.6*
Pigs	35.4	34.9	25.5
Poultry	7.6	6.8	5.3
Sheep and goats	13.9	15.0	12.1

Source: CAPRI

[5] Willet et al., 'Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems', Lancet, 2019.

[6] See SWD(2024) 63 final, Annex 6, section 3.1.5.

[7] SWD(2024) 63 final, Document 3/5.

2. Reflection of the IED proposal in the analysis

In the modelling analysis presented in the impact assessment, if no additional mitigation measures are implemented (as discussed in section 1.7.3 of the Annex 8 of the impact assessment), the projection of non-CO2 GHG emissions from agriculture are mainly driven by the assumed agriculture production trends (as shown in the previous section).

In addition, the analysis took into account the proposal for a revised Industrial Emissions Directive (IED) adopted by the Commission in 2022[8] to cover notably CH4 and NH3 emissions from intensive farming. The 2040 target impact assessment reflects the evolution of the discussions on the European Commission's proposal during the co-decision process up to July 2023, and is constrained by the descriptive capacity of the modelling used (the GAINS model). In effect, the modelling assumed that the Best Available Techniques (BAT) are implemented in agro-industrial cattle farms with more than 500 livestock units, which has an impact on the methane emissions of these installations. The farm size threshold is the same for any type of installation rearing cattle, pigs, poultry, or a mix of species.

[8] COM(2022) 156 final.

3. Mitigation options and costs

Table 4 shows the additional mitigation potential in the EU agriculture sector in 2040 at different marginal abatement costs in the three core scenarios, disaggregated by mitigation option and emission source, as represented in the GAINS model used for the 2040 target impact assessment.

For example, the use of feed additives (mitigation option) can reduce methane emissions from dairy cows (emission source) by 4.5 MtCO2-eq at a marginal abatement cost of 15 EUR/tCO2-eq. That is 52% of the maximum abatement potential of that mitigation option, as shown in Table 5.

Table 6 and Table 7 show the same type of information for the LIFE variant.

Table 4: Mitigation of non-CO2 GHG emissions in the agriculture sector in 2040 at different marginal cost levels (S1-S3 scenarios).

Mitigation of non-CO2 GHG emissions in 2040 (MtCO2-eq)	Category	Marginal abatement cost (EUR'2015/tCO2-eq)																
		0	0.1	5	10	15	20	25	50	75	100	125	150	175	200	400	1000	Max
Agriculture	**Sector**	**0.0**	**21.9**	**22.0**	**22.6**	**26.6**	**31.2**	**40.3**	**49.5**	**54.8**	**62.4**	**67.0**	**71.1**	**75.8**	**80.2**	**80.6**	**81.2**	**82.7**
--CH4	**Gas**	**0.0**	**21.9**	**22.0**	**22.6**	**26.6**	**31.2**	**31.9**	**35.4**	**36.3**	**37.1**	**37.6**	**38.0**	**38.1**	**38.1**	**38.3**	**38.4**	**38.4**
----Ban or enforcement of existing ban	**Mitigation option**	**0.0**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**
------Agricultural waste burning	Source of emissions	0.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
----Breeding through selection: enhance productivity, fertility and longevity	**Mitigation option**	**0.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**	**13.0**
------Dairy cows	Source of emissions	0.0	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
------Non-dairy cattle	Source of emissions	0.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
------Sheep	Source of emissions	0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
----Farm-scale anaerobic digestion with biogas recovery	**Mitigation option**	**0.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.4**	**8.4**	**8.4**	**8.6**	**8.6**	**8.6**	**8.8**	**8.8**	**8.8**	**8.8**	**8.9**	**8.9**
------Dairy cows	Source of emissions	0.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8
------Non-dairy cattle	Source of emissions	0.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8
------Pigs	Source of emissions	0.0	5.8	5.8	5.8	5.8	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
----Feed additives: NOP-3 or Asparagopsis (red seaweed)	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.7**	**4.7**	**8.8**	**9.4**	**12.1**	**12.9**	**13.7**	**14.1**	**14.5**	**14.5**	**14.5**	**14.6**	**14.6**	**14.6**
------Dairy cows	Source of emissions	0.0	0.0	0.0	0.5	4.5	8.0	8.5	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
------Non-dairy cattle	Source of emissions	0.0	0.0	0.0	0.2	0.2	0.8	1.0	3.5	4.4	5.0	5.4	5.7	5.7	5.7	5.7	5.7	5.7
------Sheep	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3
----Intermittent aeration and alternative hybrids	**Mitigation option**	**0.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
------Rice cultivation	Source of emissions	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
----Intermittent aeration, alternative hybrids and sulphate amendments	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.9**	**0.9**	**0.9**
------Rice cultivation	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9
--N2O	**Gas**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**8.4**	**14.2**	**18.5**	**25.4**	**29.4**	**33.1**	**37.7**	**42.1**	**42.2**	**42.8**	**44.2**
----Nitrification inhibitors	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**5.7**	**5.7**	**12.6**	**16.6**	**20.3**	**20.3**	**24.6**	**24.8**	**24.8**	**24.8**
------Fertiliser application on agricultural soils	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	5.7	12.6	16.6	20.3	20.3	20.3	20.4	20.4	20.4
------Fertiliser from grazing livestock	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	4.3	4.3	4.3
----Precision farming	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.6**	**2.0**
------Fertiliser application on agricultural soils	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	2.0
----Restoration of drained organic soils	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**
------Histosols, mineral soils used as cropland	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	4.7	4.7	4.7	4.7
----Variable rate technology	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**8.4**	**8.4**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**	**12.8**
------Fertiliser application on agricultural soils	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	8.4	8.4	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8

Table 5: Mitigation of non-CO2 GHG emissions (as percentage of the potential of the option) in the agriculture sector in 2040 at different marginal cost levels (S1-S3 scenarios).

Mitigation of non-CO2 GHG emissions in 2040 (% of the max. potential of the option)	Category	Marginal abatement cost (EUR'2015/tCO2-eq)																
		0	0.1	5	10	15	20	25	50	75	100	125	150	175	200	400	1000	Max
Agriculture	**Sector**	**0%**	**27%**	**27%**	**27%**	**32%**	**38%**	**49%**	**60%**	**66%**	**76%**	**81%**	**86%**	**92%**	**97%**	**97%**	**98%**	**100%**
--CH4	**Gas**	**0%**	**57%**	**57%**	**59%**	**69%**	**81%**	**83%**	**92%**	**95%**	**97%**	**98%**	**99%**	**99%**	**99%**	**100%**	**100%**	**100%**
----Ban or enforcement of existing ban	**Mitigation option**	**0%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
------Agricultural waste burning	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
----Breeding through selection: enhance productivity, fertility and longevity	**Mitigation option**	**0%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
------Dairy cows	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Non-dairy cattle	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Sheep	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
----Farm-scale anaerobic digestion with biogas recovery	**Mitigation option**	**0%**	**90%**	**90%**	**90%**	**90%**	**95%**	**95%**	**95%**	**97%**	**97%**	**97%**	**99%**	**99%**	**99%**	**99%**	**100%**	**100%**
------Dairy cows	Source of emissions	0%	85%	86%	86%	86%	86%	86%	86%	93%	93%	96%	96%	96%	96%	97%	100%	100%
------Non-dairy cattle	Source of emissions	0%	75%	75%	75%	75%	75%	75%	75%	76%	76%	76%	95%	95%	97%	98%	100%	100%
------Pigs	Source of emissions	0%	93%	93%	93%	93%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
----Feed additives: NOP-3 or Asparagopsis (red seaweed)	**Mitigation option**	**0%**	**0%**	**0%**	**5%**	**32%**	**60%**	**65%**	**83%**	**89%**	**94%**	**97%**	**99%**	**99%**	**99%**	**100%**	**100%**	**100%**
------Dairy cows	Source of emissions	0%	0%	0%	6%	52%	93%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Non-dairy cattle	Source of emissions	0%	0%	0%	3%	3%	14%	17%	62%	76%	87%	95%	100%	100%	100%	100%	100%	100%
------Sheep	Source of emissions	0%	0%	0%	0%	0%	0%	0%	0%	0%	39%	49%	51%	56%	58%	96%	100%	100%
----Intermittent aeration and alternative hybrids	**Mitigation option**	**0%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
------Rice cultivation	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
----Intermittent aeration, alternative hybrids and sulphate amendments	**Mitigation option**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**4%**	**89%**	**89%**	**89%**	**89%**	**89%**	**89%**	**89%**	**100%**	**100%**	**100%**
------Rice cultivation	Source of emissions	0%	0%	0%	0%	0%	0%	4%	89%	89%	89%	89%	89%	89%	89%	100%	100%	100%
--N2O	**Gas**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**19%**	**32%**	**42%**	**57%**	**67%**	**75%**	**85%**	**95%**	**95%**	**97%**	**100%**
----Nitrification inhibitors	**Mitigation option**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**23%**	**23%**	**51%**	**67%**	**82%**	**82%**	**99%**	**100%**	**100%**	**100%**
------Fertiliser application on agricultural soils	Source of emissions	0%	0%	0%	0%	0%	0%	0%	28%	28%	62%	81%	99%	99%	99%	100%	100%	100%
------Fertiliser from grazing livestock	Source of emissions	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%
----Precision farming	**Mitigation option**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**30%**	**100%**
------Fertiliser application on agricultural soils	Source of emissions	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	30%	100%
----Restoration of drained organic soils	**Mitigation option**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**100%**	**100%**	**100%**	**100%**	**100%**
------Histosols, mineral soils used as cropland	Source of emissions	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
----Variable rate technology	**Mitigation option**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**66%**	**66%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
------Fertiliser application on agricultural soils	Source of emissions	0%	0%	0%	0%	0%	0%	66%	66%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 6: Mitigation of non-CO2 GHG emissions in the agriculture sector in 2040 at different marginal cost levels (LIFE variant).

Mitigation of non-CO2 GHG emissions in 2040 (MtCO2-eq)	Category	Marginal abatement cost (EUR'2015/tCO2-eq)																
		0	0.1	5	10	15	20	25	50	75	100	125	150	175	200	400	1000	Max
Agriculture	**Sector**	**0.0**	**16.7**	**16.8**	**17.3**	**20.9**	**24.7**	**31.3**	**38.5**	**42.1**	**47.7**	**50.9**	**53.7**	**58.4**	**61.7**	**62.0**	**62.5**	**63.5**
--CH4	**Gas**	**0.0**	**16.7**	**16.8**	**17.3**	**20.9**	**24.7**	**25.3**	**27.9**	**28.6**	**29.1**	**29.4**	**29.7**	**29.7**	**29.7**	**30.0**	**30.0**	**30.0**
----Ban or enforcement of existing ban	**Mitigation option**	**0.0**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**
------Agricultural waste burning	Source of emissions	0.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
----Breeding through selection: enhance productivity, fertility and longevity	**Mitigation option**	**0.0**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**
------Dairy cows	Source of emissions	0.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
------Non-dairy cattle	Source of emissions	0.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
------Sheep	Source of emissions	0.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
----Farm-scale anaerobic digestion with biogas recovery	**Mitigation option**	**0.0**	**5.6**	**5.6**	**5.6**	**5.6**	**5.9**	**5.9**	**5.9**	**6.0**	**6.0**	**6.1**	**6.1**	**6.1**	**6.2**	**6.2**	**6.2**	**6.2**
------Dairy cows	Source of emissions	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4
------Non-dairy cattle	Source of emissions	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4
------Pigs	Source of emissions	0.0	4.0	4.0	4.0	4.0	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
----Feed additives: NOP-3 or Asparagopsis (red seaweed)	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.6**	**4.2**	**7.7**	**8.2**	**10.0**	**10.6**	**11.0**	**11.3**	**11.5**	**11.5**	**11.5**	**11.6**	**11.6**	**11.6**
------Dairy cows	Source of emissions	0.0	0.0	0.0	0.4	4.1	7.2	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
------Non-dairy cattle	Source of emissions	0.0	0.0	0.0	0.1	0.1	0.4	0.5	2.2	2.8	3.2	3.4	3.6	3.6	3.6	3.6	3.6	3.6
------Sheep	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
----Intermittent aeration and alternative hybrids	**Mitigation option**	**0.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
------Rice cultivation	Source of emissions	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
----Intermittent aeration, alternative hybrids and sulphate amendments	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.9**	**0.9**	**0.9**
------Rice cultivation	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9
--N2O	**Gas**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**6.0**	**10.6**	**13.5**	**18.6**	**21.5**	**24.0**	**28.7**	**32.0**	**32.1**	**32.5**	**33.5**
----Nitrification inhibitors	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4.6**	**4.6**	**9.7**	**12.6**	**15.1**	**15.1**	**18.4**	**18.5**	**18.5**	**18.5**
------Fertiliser application on agricultural soils	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	4.6	9.7	12.6	15.1	15.1	15.1	15.2	15.2	15.2
------Fertiliser from grazing livestock	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.3	3.3	3.3
----Precision farming	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.4**	**1.5**
------Fertiliser application on agricultural soils	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.5
----Restoration of drained organic soils	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**
------Histosols, mineral soils used as cropland	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	4.7	4.7	4.7	4.7
----Variable rate technology	**Mitigation option**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**6.0**	**6.0**	**8.9**	**8.9**	**8.9**	**8.9**	**8.9**	**8.9**	**8.9**	**8.9**	**8.9**
------Fertiliser application on agricultural soils	Source of emissions	0.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9

Table 7: Mitigation of non-CO2 GHG emissions (as percentage of the potential of the option) in the agriculture sector in 2040 at different marginal cost levels (LIFE variant).

Mitigation of non-CO2 GHG emissions in 2040 (% of the max. potential of the option)	Category	Marginal abatement cost (EUR'2015/tCO2-eq)																
		0	0.1	5	10	15	20	25	50	75	100	125	150	175	200	400	1000	Max
Agriculture	**Sector**	0%	26%	26%	27%	33%	39%	49%	61%	66%	75%	80%	85%	92%	97%	98%	98%	100%
--CH4	**Gas**	0%	56%	56%	58%	70%	82%	84%	93%	95%	97%	98%	99%	99%	99%	100%	100%	100%
----Ban or enforcement of existing ban	**Mitigation option**	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Agricultural waste burning	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
----Breeding through selection: enhance productivity, fertility and longevity	**Mitigation option**	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Dairy cows	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Non-dairy cattle	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Sheep	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
----Farm-scale anaerobic digestion with biogas recovery	**Mitigation option**	0%	89%	89%	89%	89%	94%	94%	95%	97%	97%	97%	99%	99%	99%	100%	100%	100%
------Dairy cows	Source of emissions	0%	83%	83%	83%	83%	83%	83%	84%	92%	92%	96%	96%	96%	96%	100%	100%	100%
------Non-dairy cattle	Source of emissions	0%	75%	75%	75%	75%	75%	75%	75%	76%	76%	76%	93%	93%	96%	97%	100%	100%
------Pigs	Source of emissions	0%	92%	92%	92%	92%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
----Feed additives: NOP-3 or Asparagopsis (red seaweed)	**Mitigation option**	0%	0%	0%	5%	36%	66%	71%	86%	91%	95%	97%	99%	99%	99%	100%	100%	100%
------Dairy cows	Source of emissions	0%	0%	0%	6%	52%	93%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Non-dairy cattle	Source of emissions	0%	0%	0%	3%	3%	12%	15%	61%	76%	88%	94%	100%	100%	100%	100%	100%	100%
------Sheep	Source of emissions	0%	0%	0%	0%	0%	0%	0%	0%	0%	34%	44%	46%	52%	53%	96%	100%	100%
----Intermittent aeration and alternative hybrids	**Mitigation option**	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Rice cultivation	Source of emissions	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
----Intermittent aeration, alternative hybrids and sulphate amendments	**Mitigation option**	0%	0%	0%	0%	0%	0%	4%	89%	89%	89%	89%	89%	89%	89%	100%	100%	100%
------Rice cultivation	Source of emissions	0%	0%	0%	0%	0%	0%	4%	89%	89%	89%	89%	89%	89%	89%	100%	100%	100%
--N2O	**Gas**	0%	0%	0%	0%	0%	0%	18%	32%	40%	56%	64%	72%	86%	95%	96%	97%	100%
----Nitrification inhibitors	**Mitigation option**	0%	0%	0%	0%	0%	0%	0%	25%	25%	52%	68%	82%	82%	99%	100%	100%	100%
------Fertiliser application on agricultural soils	Source of emissions	0%	0%	0%	0%	0%	0%	0%	30%	30%	64%	83%	99%	99%	99%	100%	100%	100%
------Fertiliser from grazing livestock	Source of emissions	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%
----Precision farming	**Mitigation option**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%	100%
------Fertiliser application on agricultural soils	Source of emissions	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%	100%
----Restoration of drained organic soils	**Mitigation option**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
------Histosols, mineral soils used as cropland	Source of emissions	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%
----Variable rate technology	**Mitigation option**	0%	0%	0%	0%	0%	0%	67%	67%	100%	100%	100%	100%	100%	100%	100%	100%	100%
------Fertiliser application on agricultural soils	Source of emissions	0%	0%	0%	0%	0%	0%	67%	67%	100%	100%	100%	100%	100%	100%	100%	100%	100%