Preparation of Agriculture sector projections

Inga Ziukelyte
Environmental Protection Agency
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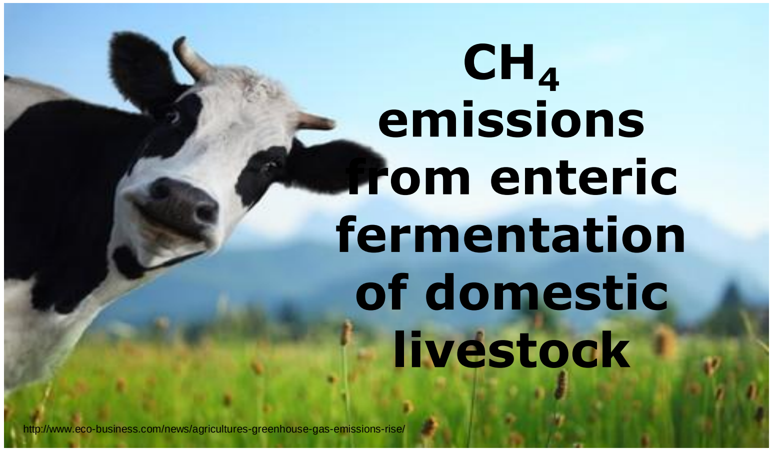
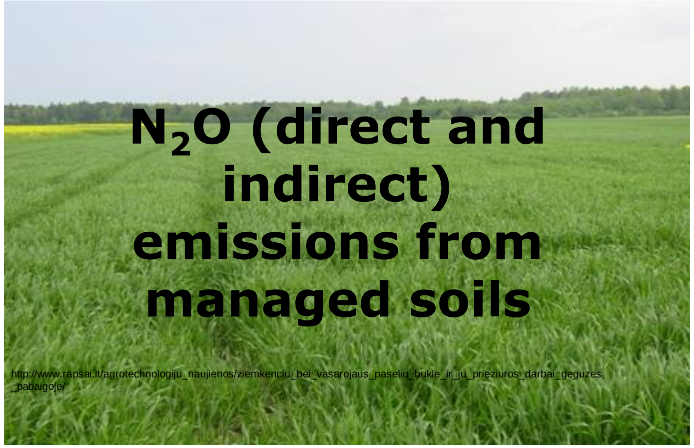
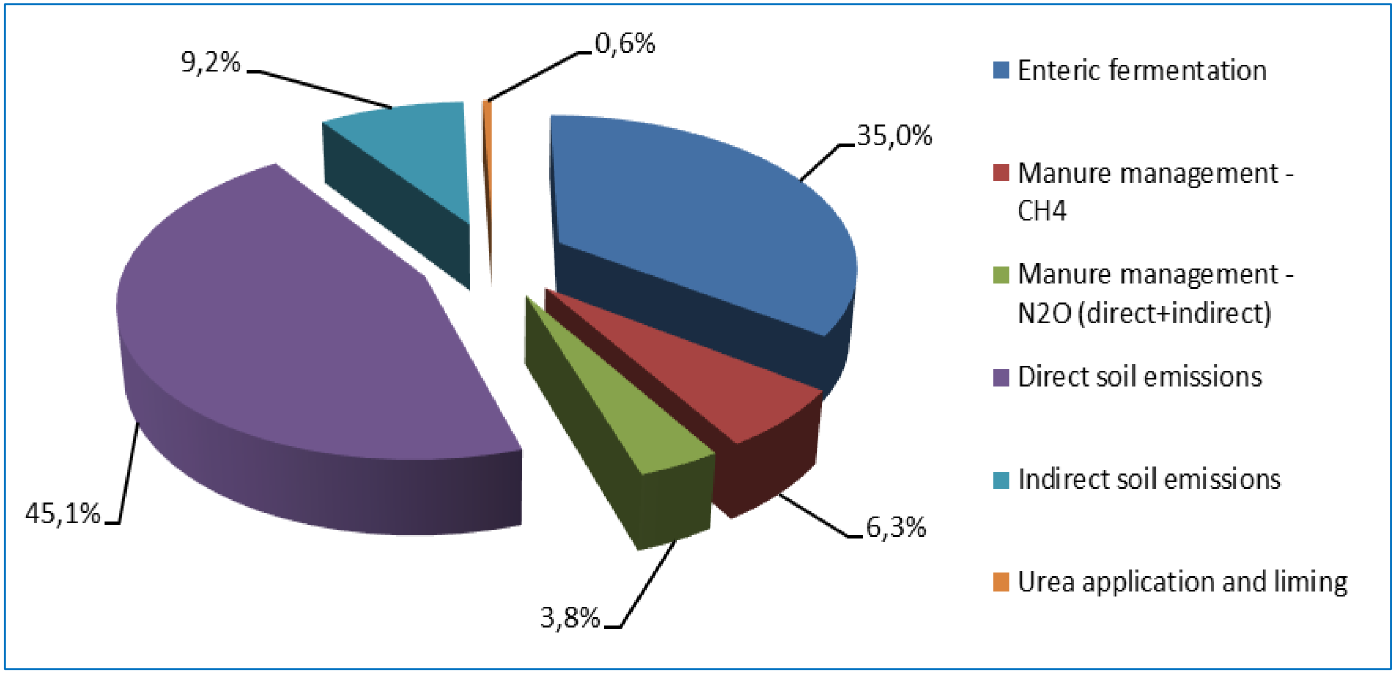
Emissions occurring in agriculture sector

GHG emissions from agriculture sector in Lithuania include:





The share of GHG emissions by categories in 2012, %



- ✓ Agriculture sector contributed 21.4% of the total GHG emission in 2012 (excl. LULUCF).
- ✓ Agriculture soils (54.3%) and enteric fermentation (35%) were the biggest emissions sources in agriculture sector.

Methodology and key assumptions

Projections of GHG emissions from agriculture sector with existing measures (WEM) are based on forecasted:

- ✓ livestock population;
- ✓ milk yield;
- ✓ harvested crops;
- ✓ consumption of synthetic N fertilizers;
- ✓ consumption of limestone;
- ✓ data on planned extension projects of biogas power plants.

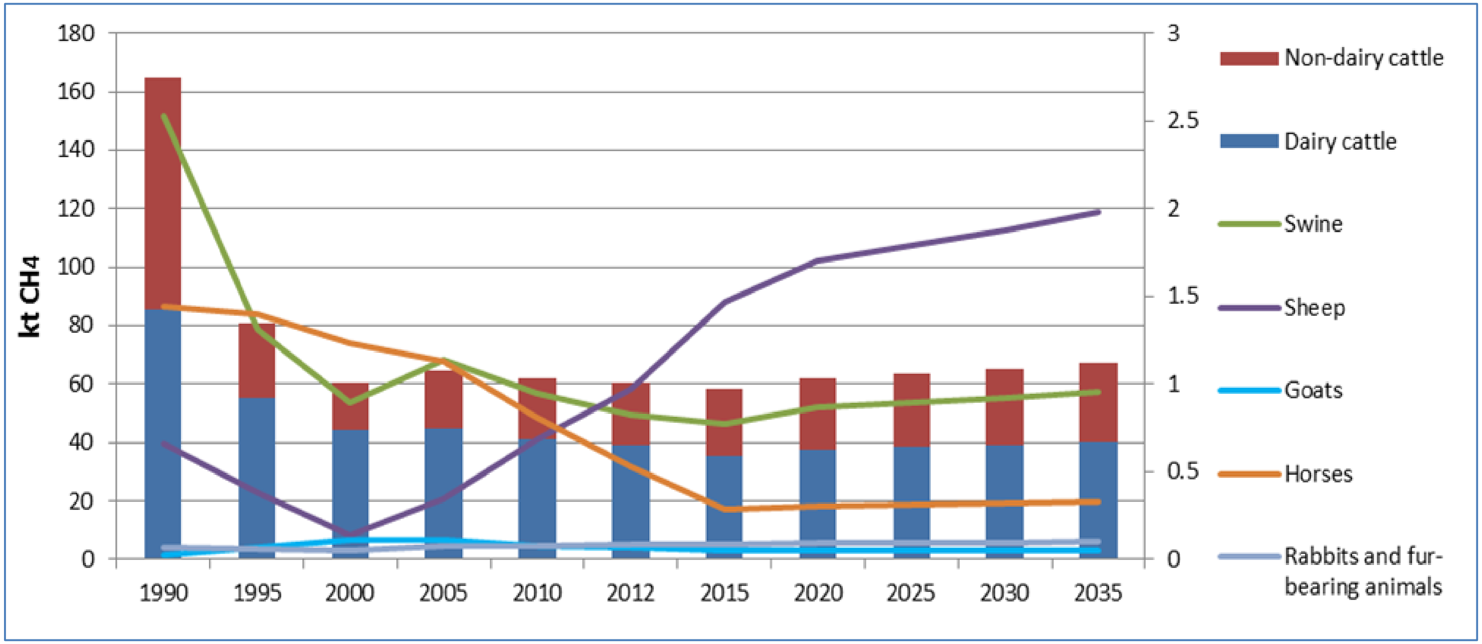
Forecast of the main data was provided by the Ministry of Agriculture, Agricultural Information and Rural Business Centre (AIRBC) and Institute of Animal Science.

Main parameters

Enteric fermentation:

- ✓ The most important projection parameter in agriculture sector is livestock population.
- ✓ The projected data for livestock population was available for the years 2015, 2020 and 2030. The data on livestock population between the period 2012-2015, 2015-2020 and 2020-2030 were interpolated. The population of livestock during the period 2030-2035 was calculated following the average annual percentage increase or decrease during the period 2020-2030.
- ✓ Livestock emission factor (EF) (kg/head/year) of 2012 was used (applicable for country specific EF) for calculation of projected CH_4 emissions from enteric fermentation .

Enteric fermentation



CH_4 emissions from enteric fermentation are mainly depended on livestock population. There is decrease in CH_4 emission from enteric fermentation in 2015 comparing with 2012. The total projected emission has a correlation with projected domestic animal population. Each category's CH_4 emission separately has a correlation with its population.

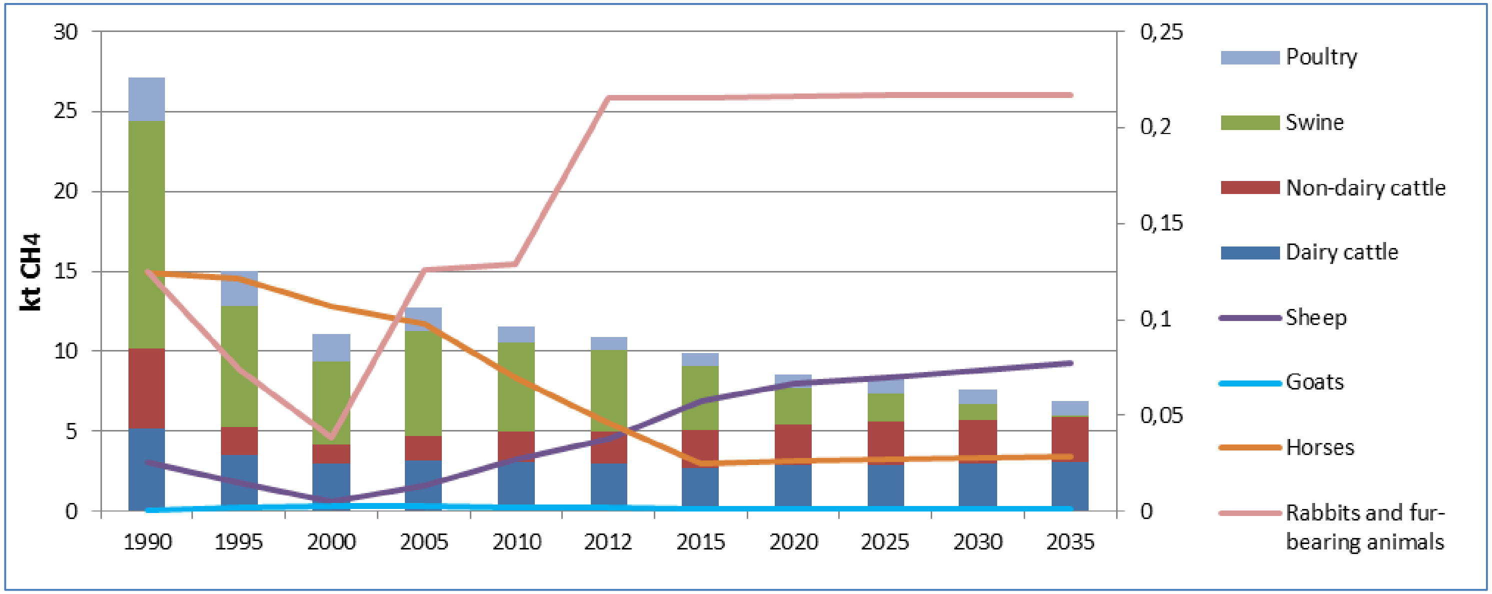
Main parameters

Manure management:

- ✓ The main activity data for calculation of CH_4 and N_2O emissions from manure management is livestock population, and data on MMS.
- ✓ Data on MMS for calculation of CH_4 and N_2O emissions from manure management in most of the categories were assumed to be the same as in 2012 except for swine.
- ✓ Taking in to account planned extension projects of biogas power plants for the period 2012-2030 the fraction of annual N_{ex} that is managed in MMS that would be treated in biogas power plants was evaluated. The main data received was planned capacity of biogas plants during the period 2012-2030.

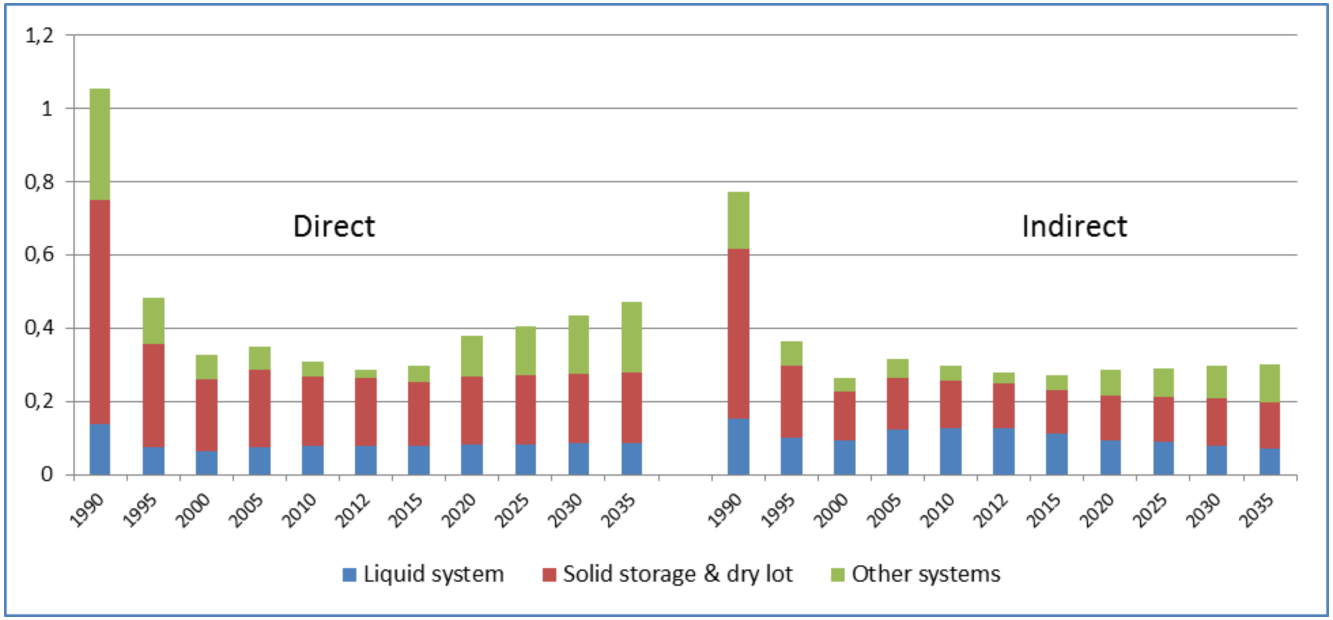
- ✓ For calculation of N_2O emissions from MMS parameters of livestock population and milk yield were used.
- ✓ Projected value of milk yield is important as it is used for calculation of N excretion per head of dairy cow. The values of fraction of annual N_{ex} that is managed in MMS were used the same as for CH_4 emission calculation from manure management.

Manure management



- ✓ Total reduction of emissions by 2035 might be more than 35% comparing with 2012. All this reduction is due to swine liquid manure utilization in biogas power plants.
- ✓ As it can be seen from the figure above the decrease is caused by reduction reached in swine category. Except for swine emissions from other animal categories manure management have a correlation with their population – projected emissions depend only on population variation as fraction of annual N_{ex} that is managed in MMS was left constant.

Direct and indirect emissions from manure management



- In manure management CH_4 category main activity data are livestock population and fraction of N_{ex} managed in MMS.
- It is expected that emissions from direct N2O manure management increase during the whole period and comparing with the base year it might increase by 65%.
- In indirect emissions there might be a small decrease in 2015 comparing with 2012. After 2015 indirect N_2O emissions will start increasing. An increase will continue in 2030 and the total increase might reach 7.5% comparing with the base year.

Main parameters

Agricultural soils:

The main activity data for calculations of projected N_2O emissions from agricultural soils category are:

Agricultural soils

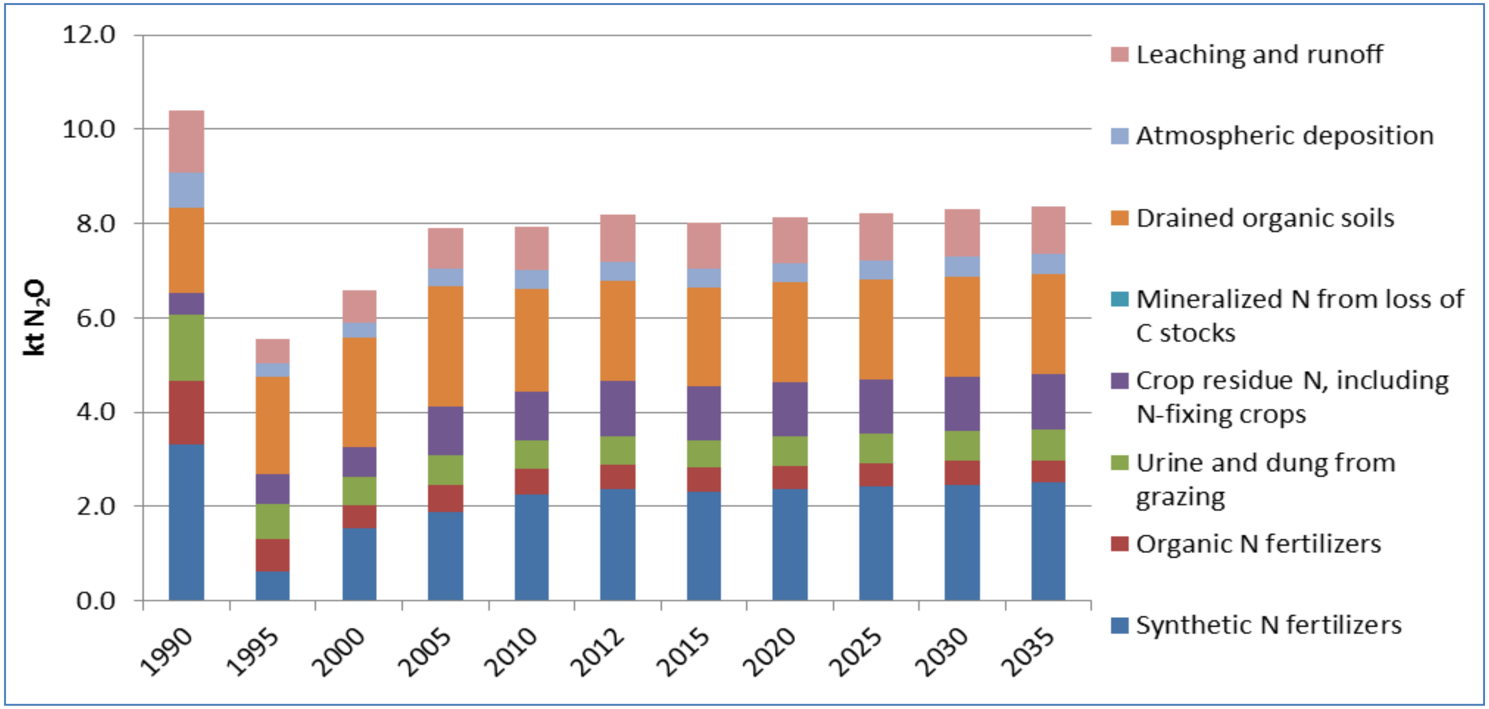
- For calculation of N_2O emissions from agricultural soils the projected data for the year 2015 and 2020.

- The main activity data for calculation of projected N_2O emissions from synthetic N fertilizers application is projected values of N fertilizers consumed. These values were based on the demand of synthetic fertilizers application to harvested area.

- N_2O emissions from organic fertilizers included animal manure applied to soils, sewage sludge and compost used as soil amendments. Animal manure applied to soils was calculated based on the calculations performed in manure management category. The increase in N_2O emissions were influenced by the increase in livestock population.

- To calculate N_2O emissions from crop residues activity data of the main crops that represent majority of all crops harvested in Lithuania and harvested area of these crops were projected. The activity data for other crops remained constant as in 2012.

Agriculture soils



- ✓ In general comparing 2012 with 2015 there were a small decrease in all agricultural soils categories. However starting with 2015 there might be small increase in all categories until 2035.

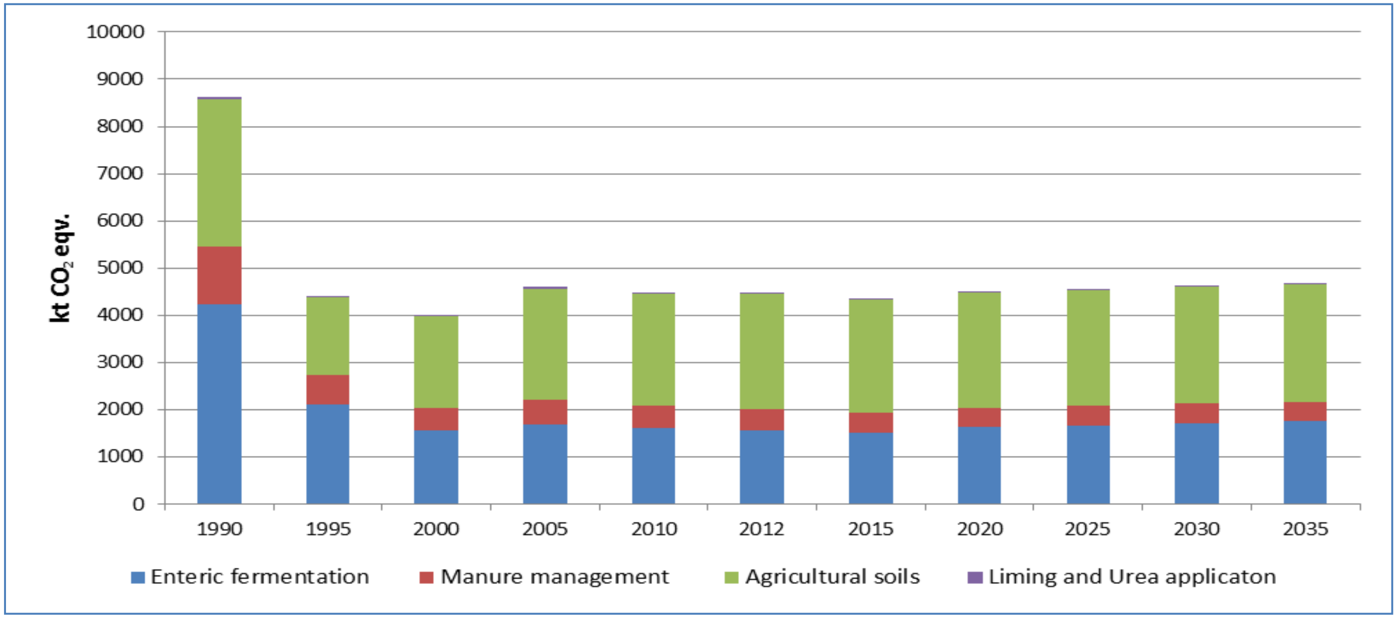
Liming and urea application

Category	2012	2015	2020	2025	2030	2035
Liming	10.93	8.08	8.08	8.08	8.08	8.08
Urea application	15.72	15.36	15.67	15.98	16.31	16.51
Total	26.65	23.44	23.75	24.07	24.39	24.59

- ✓ Calculations of CO_2 emissions involved soil liming and urea application.
- ✓ Projections of consumed lime were provided by the Ministry of Agriculture and amount of urea applied to soil was calculated based on International Fertilizer Industry Association (IFA) data (average amount of urea fertilizer from the total amount of N fertilizers consumed).

Historical and projected GHG emissions by categories, kt CO_2 eq.

The largest source of GHG emissions is agricultural soils. Comparing the share of GHG emissions it will not change a lot during projected period and agriculture soils subsector will remain the largest source of emissions.



Total GHG emissions from agriculture sector will decrease by 2.8% from 2012 to 2015 but will start increasing afterwards – by 3% from 2015 to 2020, by 1.5% in 2025, and by 1.3% in 2030 and 2035.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