# Addressing greenhouse gas emissions from agriculture and LULUCF in the context of the 2030 EU climate and energy framework

Fields marked with * are mandatory.

## Consultation on the integration of agriculture, forestry and other land use into the 2030 EU climate and energy policy framework

The European Commission has prepared this document as the basis for a public consultation. It is addressed to citizens, stakeholders and experts in the field of agriculture and forestry. Its purpose is to collect experiences, suggestions and opinions related to the role of these areas in the 2030 EU climate and energy policy framework. The consultation seeks input on questions concerning policy alternatives to be discussed in the light of the European Council conclusions in October 2014.

This consultation is launched in parallel with the "Consultation on the preparation of a legislative proposal on the effort of Member States to reduce their greenhouse gas emissions to meet the European Union's greenhouse gas emission reduction commitment in a 2030 perspective."[link]

## 0. Registration

*0.1 What is your profile?

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- ◉ Trade association representing businesses/farmers
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- ○ Citizen
- ○ Other

*0.2 Please enter the name of your business/organisation/association/etc.:

European Biogas Association

*0.3 Please enter your contact details (name, address, telephone etc.):

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*0.4 If relevant, please state what sector you represent:

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- ○ Forestry
- ◉ Other

0.5 If you chose "Other", please specify:

Biogas sector: most European biogas plants use agricultural feedstock

*0.6 Please indicate your country of residence or activity:

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*0.7 The results of this stakeholder consultation will be published unless stated otherwise. Can we include your replies in the publication?

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18191445640-83

## 1. INTRODUCTION

In October 2014, EU leaders agreed upon a greenhouse gas emissions reduction target of at least 40 % by 2030 compared with 1990 together with other building blocks of the 2030 policy framework for climate and energy, as proposed by the European Commission in January 2014. [link]

This 2030 framework aims to make the EU's economy and energy system more competitive, secure and sustainable and also sets a target of at least 27 % for renewable energy and energy efficiency savings by 2030, respectively.

This paper aims at consulting EU citizens and stakeholders on the main policy options for including agriculture, forestry and other land use into the 2030 greenhouse gas mitigation framework, taking into account the multiple objectives of this sector:

- the need to ensure coherence between the EU's food security, climate change and energy objectives;
- and the need to examine the best means of encouraging the sustainable intensification of food production, while optimising the sector's contribution to greenhouse gas mitigation and sequestration, including through afforestation.

At present, the EU is on track to fulfil its international and EU level commitments to reduce greenhouse gas emissions by 2020 by 20 % compared with 1990 levels. Since 1990, emissions in the energy, agriculture, industrial processes and waste sectors have decreased. Throughout the same period, land use, land use-change and forestry (LULUCF) have remained a net sink [1], having absorbed more carbon dioxide ($CO_2$) from the atmosphere than they emitted.

[1] The activity, process or agent that removes a greenhouse gas from the atmosphere is called "sink".

## 2. MEETING MULTIPLE OBJECTIVES OF AGRICULTURE, FORESTRY AND OTHER LAND USE

Agriculture, forestry and other land use serve multiple objectives, such as the production of food, feed, raw materials and energy, raising environmental quality and contributing to climate mitigation and adaptation. Counterbalancing some of the EU's emissions, these sectors can absorb carbon dioxide from the atmosphere through photosynthesis; the carbon dioxide is then stored as carbon in vegetation and subsequently also in soils.

The sectors contain two very important carbon stocks: forest biomass and soil organic carbon. Different land uses and management practices in forestry and agriculture can significantly raise or limit emissions, enhance removals, and/or increase climate resilience. For example, livestock production, fertiliser use and deforestation produce greenhouse gas emissions, while the maintenance of permanent grasslands, afforestation or agroforestry measures can remove CO2 from the atmosphere or reduce emissions.

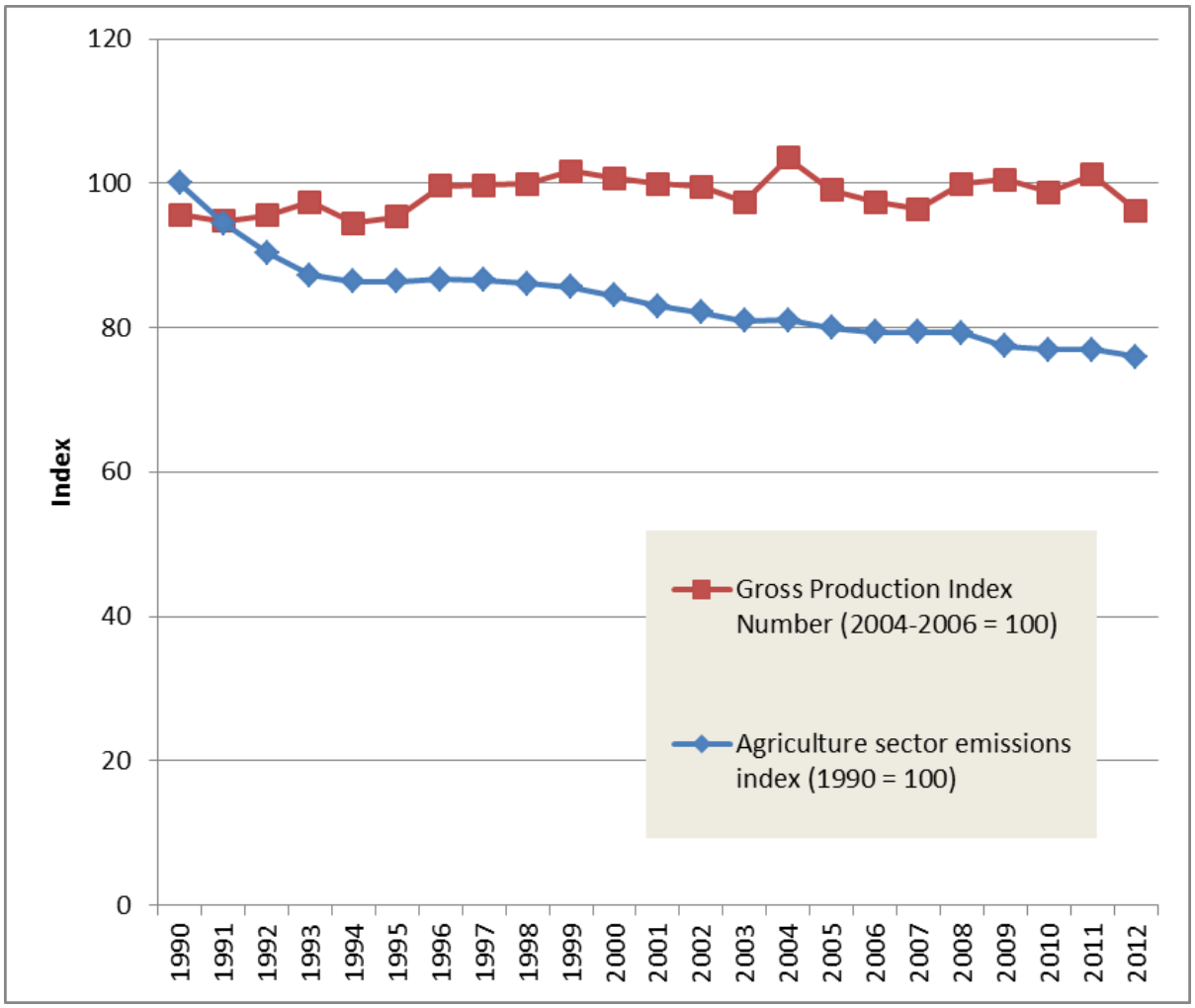
Land is a scarce resource. Different land uses can be seen as a set of competing but potentially compatible interests:

- permanence and resilience: the long-term stability of carbon pools (for the purposes of carbon sequestration, biodiversity protection and ecosystem preservation and thereby conservation of natural resource production potential);
- security of food production: a key factor given that the world population is expected to grow by 30 % by 2050; and
- enhancement of the provision of renewable biomass for energy or material substitution.

In order to successfully balance these competing interests, it is important to develop an integrated approach to the management of land use in climate policy. The overarching objective should be to optimise actions on land, i.e. to maintain food security while fully exploiting the mitigation potential of different land uses, optimising the protection of nature and biodiversity and providing a basis for green growth and rural development. There is also an external dimension: emissions from land use change, such as deforestation in third countries, could be reduced through more efficient and integrated land use management inside the EU, thereby reducing the dependence on imports.

Increasing agricultural productivity can happen with reduced emissions and can contribute to sustainable agricultural policies. For instance, between 1990 and 2014, while agricultural production was maintained or even slightly increased, the sector's emissions of non-CO2 greenhouse gases (methane (CH4) and nitrous oxide N2O)) declined.

*Figure 2.1: Non-CO2 emissions and the volume of production in the agriculture sector, 1990-2012*




*Source: Food and Agriculture Organisation and European Environment Agency (EEA)*

Increased use of biomass and wood products can also lower emissions in other sectors through energy and material substitution, for instance of fossil fuels in energy production, and of steel and cement in construction. Advancing the bio-economy is therefore a promising avenue from a climate point of view. However, the increased use of biomass for the production of renewable energy and for material substitution shifts emissions from the energy sector to the land use sector, in particular to forest management. While emissions savings from the bio-economy produce visible emissions reductions in certain areas of the EU's climate policy, they can be associated with increases in forestry emissions. The future climate framework needs to be constructed in such a way that the overall climate benefit is assessed in an integrated manner. A proper accounting framework at the level of Member States is therefore essential to adequately reflect changes in land use and management, especially in forests. Furthermore, increased burning of biomass can also affect air quality.

**1. In your view, which of the multiple objectives of agriculture, forestry and other land use will gain most in relative importance by 2030?**

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Increase productivity and effective land use of agricultural soils (e.g. double cropping, yield increases). Renewable energy, e.g. biogas plants, can contribute to sustainable agriculture: for example through the use of digestate as an organic fertiliser balancing or even increasing the humus content of the soils and through the cultivation of catch crops and cover crops which help to avoid nutrient leaching while reducing the need for expensive, environmentally harmful pesticides. Through best practices of the biogas technology and in line with the concept 'biogasdoneright' (orig. Italian: 'Biogasfattobene'), food production, biomass availability for energy and materials as well as reduced GHG emissions from the sector are all at the same time feasible. Digestate's contribution to the soil property combined with the use of tractors and trucks fuelled by biomethane can even convert farmland and farming from a net GHG source to a GHG sink.

**2. How can the contribution of agriculture, forestry and other land use to the production of renewable energy and raw materials be optimised, while fully exploiting the mitigation potential in these sectors?**

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In line with the EU's CAP, farmers must introduce crop diversification and ecological focus areas. Crops resulting from these measures can be used for biogas production, because even though these areas must be kept open, cutting of the grass is still needed. Letting grasses decompose, would cause about 50 % C and N losses through leaching and air emissions which can be avoided through anaerobic digestion (to read more: W. Hartl: "Verluste der oberirdischen Biomasse von abfrostenden Begrünungspflanzen durch Ausgasung vor der Einarbeitung in den Boden", Endbericht, 2010). Also degraded lands can be devoted to energy crop cultivation avoiding for example desertification. Secondly, farmers can use digestate, the second product of anaerobic digestion as fertiliser reducing thereby the need for expensive and polluting mineral fertilisers. Research in the biogas sector has improved the coincident production of food , feed, energy and fertilisers from the same hectare of land.

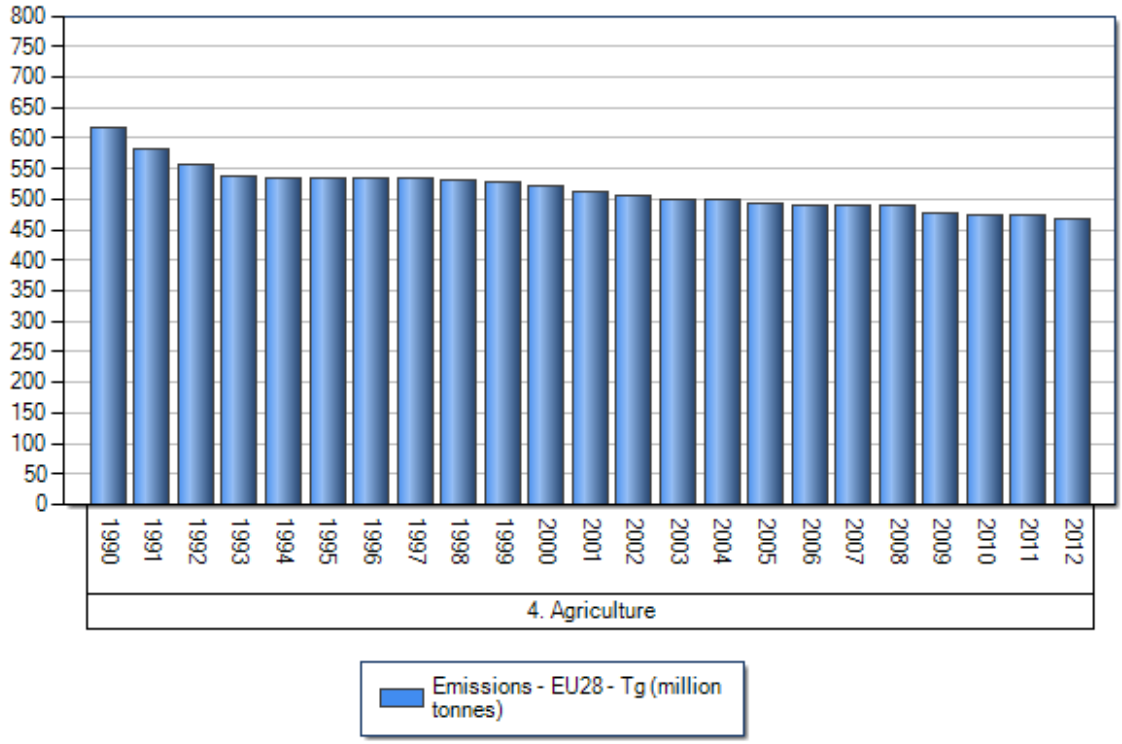
## 3. EVOLUTION OF GREENHOUSE GAS EMISSIONS FROM AGRICULTURE, FORESTRY AND OTHER LAND USE IN THE EU

**Agriculture non-CO2 emissions**

In 2012, agriculture non-CO2 emissions amounted to 10.3 % of total emissions in the EU. Since 1990, the sector's emissions have declined by nearly 150 Mt CO2eq, to 76 % of the 1990 base year emissions for the sector (Fig. 3.1).

Half of the agriculture-related emissions came from agricultural soils (mostly N2O), roughly one third from enteric fermentation in animals, primarily cattle (mostly CH4), and the remainder from manure management (N2O and CH4) and other activities. Since 1990, each of these three major sources has shown declines in emissions of more than 20 %. [link]

*Figure 3.1: The development of agricultural non-CO2 emissions in the EU since 1990*



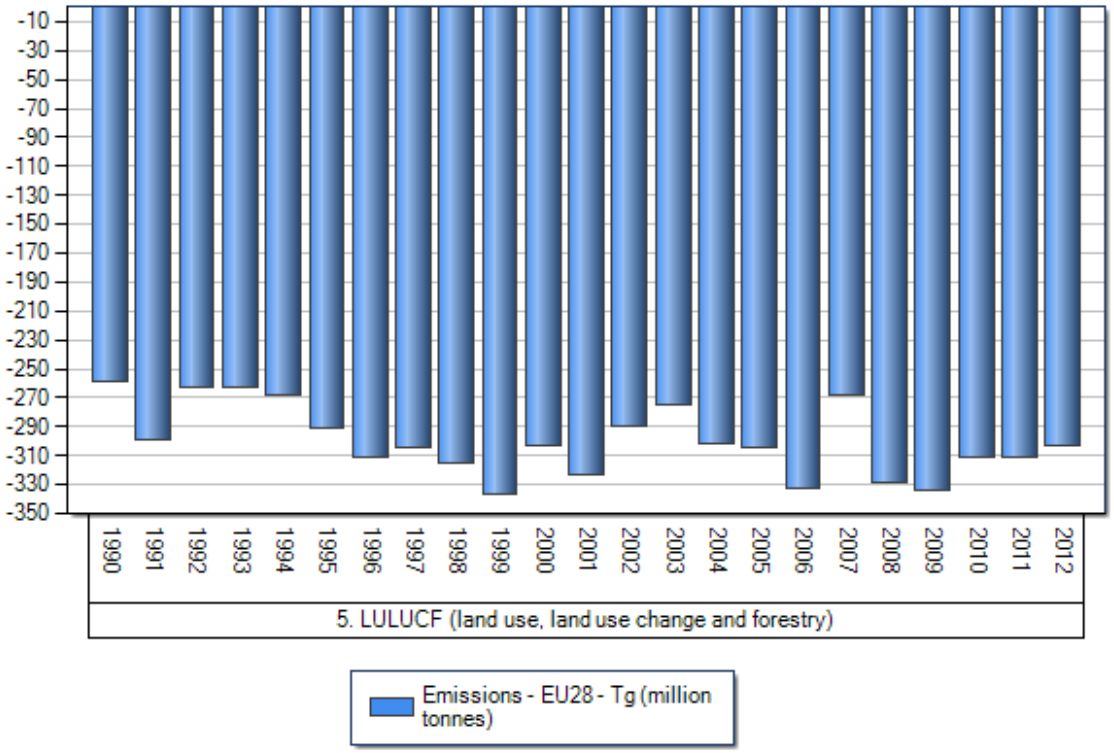

*Source: EEA 2015*

Significant differences in this trend exist across Member States, particularly those joining the EU after 2004, due to structural changes in the sector. Moreover, while the year-on-year trend at EU level is relatively stable, the interannual fluctuation of emissions at Member State level can be higher. Generally, the emissions of methane from agricultural sources are relatively stable over time, while agricultural N2O emissions are much more variable and can fluctuate by as much as 15 % of N2O base year emissions from one year to the next (see Annex). In the current climate policy framework, this kind of variability has been successfully accommodated through a degree of flexibility in annual compliance cycles (e.g. carry forward, carry-over, transfers to/by other Member States - see the Effort Sharing Decision in section 5).

**CO2 emissions and removals from land use, land use change and forestry**

Since 1990, the sink attributable to land use, land use change and forestry in the EU has essentially remained stable at around 300 Mt CO2 per year, although with considerable interannual variability even at the aggregate EU level (Figure 3.2). As a proportion of total EU emissions, LULUCF net removals have increased from around 4.6 % in 1990 to over 6.6 % on average during the first commitment period (2008-12) of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC).

*Figure 3.2: Removals by the LULUCF sector reported under UNFCCC since 1990 for the EU-28. The graph below shows the simple balance of land emissions and sinks from all land categories, without application of Kyoto Protocol accounting rules.*



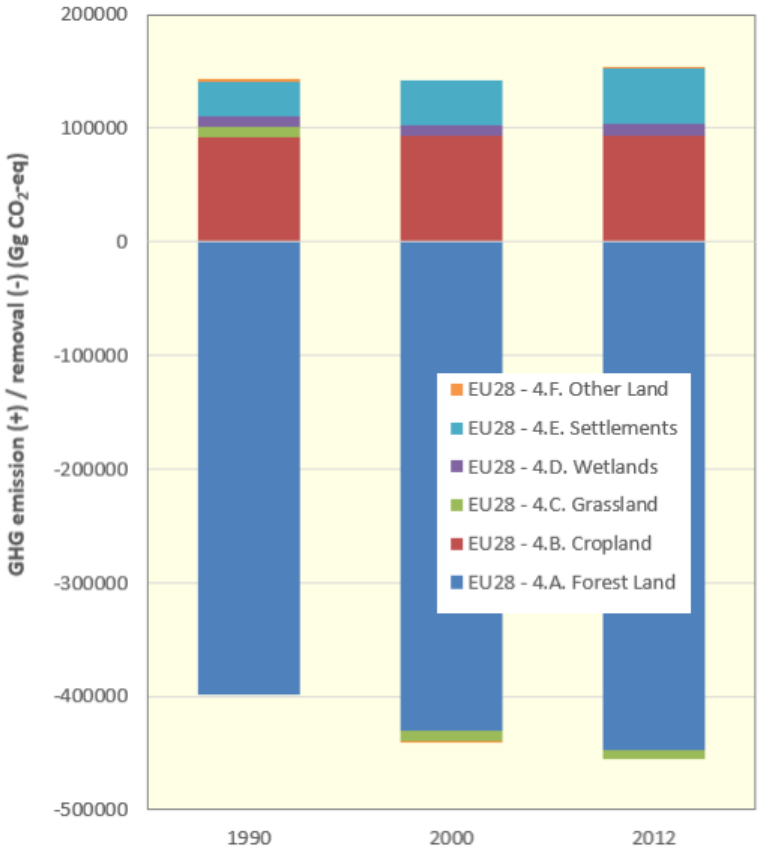

*Source: EEA 2015*

Moreover, the interannual fluctuation in a given Member State may be as much as 25 % between years. This is due to the nature of a biophysical system: droughts, floods, forest fires and other weather extremes can all disturb long-term trends.

International climate policy under the Kyoto Protocol has taken a cautious approach in order to ensure overall environmental integrity. CO2 emissions and removals from the land use sector are accounted for differently from the way they are reported, owing to interannual fluctuations, measurement uncertainties, and the need to identify additional action with forest and soil sinks (see also section 5).

Figure 3.3 illustrates how CO2 removals are balanced by CO2 emissions from the reported land use categories. Emissions are mostly related to conversions from land categories with high storage of carbon to categories with low storage, for instance from forest to non-forest, pasture land to cropland, and cropland to settlements. LULUCF emissions in the EU-28 amounted to approximately 150 Mt CO2eq in 2012 — considerably less than the sink from standing forests, which by 2012 amounted to over 400 Mt CO2eq.

*Figure 3.3: EU-28 aggregate values for land categories in the LULUCF sector*




*Source: Data submitted to the UNFCCC*

Under the application of Kyoto Protocol rules, cropland and grazing land emissions are accounted for against a historical baseline, currently the reported emissions in 1990. As can be seen from Figure 3.3, at EU level, the relative change between 2012 and 1990 is small, and the accounted values would also be relatively small. Likewise, the accounted values for standing forest try to capture the change in sink due to direct action, and would also be smaller than the values reported in greenhouse gas inventories. The accounting rules, therefore, attempt to ensure that additional mitigation activities are appropriately reflected, and to exclude changes in carbon stocks that are not due to policy.

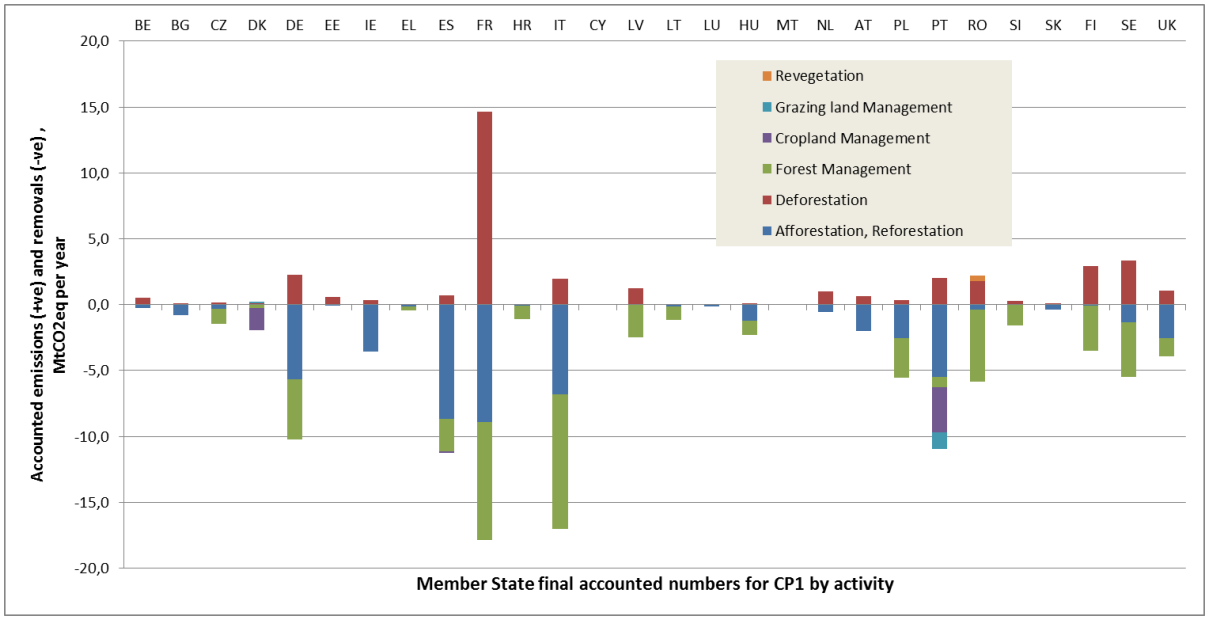
The relatively simple overall picture presented in Figures 3.2 and 3.3 at EU level is more complex when viewed by Member State:

Some Member States, like Finland, Sweden and Slovenia, have relatively large forests with a corresponding large sink and comparatively small agricultural sectors. Some Member States with large forest areas also tend to show relatively high levels of land use change, especially deforestation. The potential for afforestation is limited in densely populated Member States. Organic soils, generally found in northern Europe, can result in high emissions when drained or when permanent pasture on organic soils is converted to cropland. Corresponding land use change on mineral soils has a lower impact. The hotter, drier climates of southern Europe offer a lower potential for sequestration of carbon through soil management or for increasing biomass levels, which tend also to be prone to natural disturbances such as fire.
Figure 3.4 gives an overview of the accounted LULUCF activities in various Member States in the period 2008-12.[1] These accounts, prepared under the Kyoto Protocol first commitment period, illustrate variations of credits and debits generated by Member State, even if they do not cover all the activities that are required under the Kyoto Protocol or EU legislation today.[2] As to be expected considering their geographical size and level of forestry, Germany, Spain, France and Italy all report significant exchanges of carbon, while smaller countries show smaller flows. However, these patterns will change, with accounted forest sink becoming more focused on additional action from 2013 due to rule changes, and the coverage of activities widening under Decision No 529/2013/EU on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land use change and forestry (the LULUCF Decision).

[1] It should be noted that the sum of emissions and removals reported in the LULUCF sector is not equal to the sum of emissions and removals accounted for LULUCF activities (see section 5).

[2] Only 18 Member States elected forest management as activity in the first commitment period; it became mandatory in the second commitment period. The EU LULUCF Decision also requires that Member States provide estimates for cropland management and grazing land management activities.

*Figure 3.4: Member State accounts of emissions debits and removal credits for the LULUCF sector under the first commitment period (2008-12) — annual average*




*Source: Joint Research Centre (to be published)*

**3. How can the new framework ensure a fair and equitable distribution among Member States of action for mitigation in agriculture, forestry and other land use and reflect biophysical, geographical, and socio-economic variability and differences among Member States?**

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Biogas technology has proved to be successfully deployable all across the EU. New rules and accounting methods for the digestate spread in the farmland, based on the new data gathered in the last years on the effect of digestate amending soil, and the use of soil as carbon sink, could boost the capture of CO2 from the atmosphere and its storage in the soils, with positive effects on farm productivity and increased resilience on climate change effects (better water usage efficiency, better nitrogen usage efficiency among the other parameters). The use of mineral fertilisers is still increasing in several Member States: switch to organic fertilisers and more prudent use of mineral fertilisers would decrease tonnes of N2O emissions and contribute to sustainable use of natural resources. In order to significantly increase the use of organic fertilisers, they should be regulated at EU level; there is a clear need for the revision of the Fertiliser Regulation.

## 4. MITIGATION POTENTIAL IN THE LULUCF AND AGRICULTURAL SECTORS

**Mitigation potential and technical mitigation opportunities in the agricultural sector**

The results of an earlier impact assessment for 2030 and 2050 firmly underline the growing importance over time of mitigation in the agriculture sector and on land. By 2050, in the case of an overall reduction of greenhouse gas emissions of 80 % in the EU, the proportion of agricultural emissions is estimated to rise to about one third of all EU greenhouse gas emissions, thereby tripling its current share in the EU's emission budget.[link]

The impact assessment accompanying the proposed 2030 climate policy framework [link] also considers more limited cost-efficient mitigation potential in agriculture than in other sectors. In the scenarios that achieve a 40 % greenhouse gas emission reductions target by 2030, the reduction of agricultural non-CO2 emissions (CH4 and N2O) ranges from 19 % to 28 % in 2030 compared with 2005. As the overall reduction target for sectors not covered by the EU Emissions Trading System has been set at 30 %, other sectors (such as buildings, transport, and waste) would therefore have to deliver relatively higher emission reductions to achieve the EU reduction objectives. A cost-effective contribution by agricultural sector depends on a number of factors, including the further development of reliable and practicable mitigation technologies. As highlighted in the impact assessment, mitigation options and their practical implementation in policy terms still need to be further analysed.

Though cost-effective mitigation potential in agriculture is considered more limited when compared with other economic sectors included in the Effort Sharing Decision (see section 5), there are already some examples available that effectively are win-win measures:

- better manure management, in particular through biogas production;
- improvements to fertiliser efficiency and greater use of natural sources of fertiliser;
- increased livestock efficiency, including health improvements; synergies from agricultural land measures (e.g. the use of cover crops or catch crops) mentioned below; and
- farm carbon audits and climate advisory services that can inform farmers about mitigation options available at farm level.[link]

These practices, requiring different levels of upfront investment, help to improve the resource efficiency and greenhouse gas balance of farms. A range of other measures could become available in the near future, including optimisation of feeding of livestock (e.g. feed additives), nitrification inhibitors, and operationalisation of current experimental breeding in order to reduce livestock emissions per unit.

In addition to the reduction of direct emissions from agriculture, the better use of residues and agricultural waste for bioenergy or biomaterial production may have significant potential to contribute to climate change mitigation.

**Mitigation potential and technical mitigation opportunities in the LULUCF sector**

LULUCF is at present a net sink in the EU. However, without additional measures, projections show that the volume of removals will gradually decline by more than 10 % in the period 2005-30. [link] This is the result of various trends, the most important ones being the development of timber and energy wood demand and the skewed age structure of European forests.

The technical opportunities for climate action in the LULUCF sector vary between Member States, both in terms of the biophysical and economic potential. Mitigation options vary from region to region, and generalisations on an overall EU level are therefore uncertain. Differences are largely linked to the extent of forest cover and, to a smaller degree, soils with high carbon content. Estimates of additional mitigation potential in the LULUCF sector are still under development by Member States, and the magnitude of the additional potential will have to be further analysed by the Commission.

Nevertheless, recent information on LULUCF mitigation options obtained from Member States and other studies seem to suggest that there is significant additional mitigation potential related to a number of operations and activities:

- Cropland currently emits around 100 Mt CO2eq each year in the EU; this could be reduced significantly by 2030 by addressing some of the hotspots. The cultivation and draining of peatland in northern European countries stands out as a key category.
- Cropland emissions can be further reduced by the use of cover or catch crops and by retaining crop residues in order to improve soil carbon and soil organic matter.
- Significant potential is also provided by the establishment of agroforestry systems; depending on the previous land use, they can provide carbon sequestration benefits while maintaining a high level of agricultural productivity.
- Afforestation, particularly in Member States with marginal agricultural land, and better constraints on deforestation.
- Forest management activities could be made more efficient, for instance by enhancing forest productivity, improving forest protection against fire and other disturbances, improving soil-conserving harvesting techniques, and making better use of the incremental growth of existing forests.

**Costs of potential mitigation measures**

Information on the cost-effectiveness of measures in agriculture, forestry and other land uses is still patchy, and cost estimates vary significantly between Member States.

In agriculture, some methods for reducing the need for nitrogen fertilisation — such as the use of cover or catch crops, improved crop rotation, and farm-scale anaerobic digestion plants — are often considered low-cost or even financially beneficial to farm businesses, depending on the structural changes required. Solutions of a more technical nature, such as the use of nitrification inhibitors, precision farming and the restoration of wetlands on drained organic soils, may entail variable, higher costs, depending upon the opportunities available.

With respect to agricultural land management under LULUCF, improved cropland and grazing land management (e.g. agroforestry, prohibition of residue burning, or reduced tillage) are often considered as low to medium-cost mitigation options. Implementing land use change — which may imply changes to farm structures — is usually more complex and may lead to higher costs, while nevertheless constituting compelling opportunities for potential mitigation.

On the forestry side, longer-term afforestation measures can produce significant carbon sequestration per hectare with variable upfront costs depending on location. Much depends on the type of land and existing vegetation being converted to forest, and on the type of forest created. In some Member States, reducing deforestation is reported to be a relatively cheap mitigation alternative. Certain forest management measures (see above) and optimised silvicultural techniques [link] could also be listed among the low to medium-cost options for enhanced removals.[link]

**4. What are the most promising and cost-effective greenhouse gas reduction measures related to agriculture, forestry and other land use? Are there any technologies that would deserve special attention in research and technology development?**

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AD contributes to improved soil carbon, improved field capacity and improved micro-organism in soil, avoided methane emissions and reduced use of mineral fertilisers while producing decentralised energy. As biogas is almost entirely ‘made in the EU’, investments pay back with green rural employment and economic growth. Therefore, there should be more research devoted to increasing soil properties as field capacity avoiding wind, water erosion and desertification, thereby improving yields and productivity in agriculture in order to benefit both, biogas plants and cultivation of food and feed crops. Essentially the same microbiological events take place in the biogas reactor and in the stomach of ruminants. Extensive research to understand the limiting factors governing the operation of the microbiological communities could lead to rational management of their function, leading to improvements in the biogas and biofertiliser production and in the reduction of GHG emissions by ruminants.

**5. What are the main obstacles and barriers to the implementation of emission reduction measures in agriculture, forestry and other land use?**

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At the moment, the lack of carbon credit for the use of digestate can be seen as a barrier to the reduction of GHGs in agriculture. A better accounting system would allow the emissions from agriculture to decrease significantly, at least for countries with a strong biogas sector. The EU biogas sector could become a strong driver of GHG mitigation in agriculture if the carbon flows are properly accounted.
Another aspect is the dissemination of best practices of the biogas sector to the regions where biogas at farms has not yet been deployed.

## 5. AGRICULTURE, FORESTRY AND OTHER LAND USE IN THE CURRENT EU CLIMATE POLICY FRAMEWORK

**The current overall climate policy framework until 2020**

The current EU climate policy framework, including the commitments under the Kyoto Protocol, is economy-wide and covers all sectors and greenhouse gases. It consists of three main elements:

1. Approximately 45% of the EU's emissions are covered by the EU Emissions Trading System (EU ETS), directly involving more than 11 000 large installations in power generation and manufacturing industries.
2. A large part of the emissions from sectors outside the EU ETS (e.g. CO2 emissions from transport, heating of buildings, non-CO2 emissions from agriculture and waste — more than 50% of the EU's total emissions) are addressed by the Effort Sharing Decision.[link]
3. The remaining CO2 emissions and removals from land use, land use change and forestry were not included in the EU's domestic reduction target for 2020, but are covered by international obligations under the second commitment period of the Kyoto Protocol. This difference is because, at the time of agreeing the 2020 targets in 2008, the international rules for LULUCF accounting were at an early stage and not fully agreed internationally.

Agriculture, forestry and other land use are at present regulated in two separate pillars of the overall EU climate policy framework. Non-CO2 emissions from agriculture are covered under the Effort Sharing Decision and CO2 emissions and removals from land use, land use change and forestry [1] are covered under the Kyoto Protocol.

The Effort Sharing Decision establishes binding annual greenhouse gas emission reduction targets for Member States for the period 2013–20. These national targets are differentiated according to the relative wealth of each Member State. In contrast to sectors in the EU ETS, which are regulated at EU level, it is the responsibility of Member States to define and implement national policies and measures to limit emissions from the sectors covered by the Effort Sharing Decision.

**Current regulatory framework for CO2 emissions from land use, land use change and forestry**

Three aspects of the current regulatory framework are of key importance: reporting and accounting; target; and flexibility.

***Reporting and accounting***

Accounting rules under the Kyoto Protocol are designed to ensure that only those actions that are considered 'additional' to the status quo can count towards reduction targets. As a result, the sum of emissions and removals in the LULUCF sector is not equal to the amount of removals recognised for reporting purposes under the UNFCCC.

Rules for measuring and reporting emissions and removals under LULUCF for the purposes of the first commitment period (2008-12) of the Kyoto Protocol were finalised among international partners in 2005. These, however, were patchy and not comprehensive. Based upon this experience, improved methodologies were negotiated, and adopted at the Durban climate conference in 2011.[link] Certain key challenges — like the broader coverage of relevant activities and pools, the impact of natural disturbances, permanence and the accuracy of data — have been better addressed through this amended set of rules, applicable under the second commitment period (2013-20).

Though the net sink of LULUCF in the EU in the first commitment period remained relatively stable at around 300 Mt CO2 a year, the average annual level that could be used for accounting purposes was only 75.1 Mt CO2.[2] As rules have changed for the second commitment period, notably for forest management, this figure is expected to decrease further — in the absence of additional action — to around 25 Mt CO2 a year.[3]

The international LULUCF rules adopted in Durban have been laid down in the current EU accounting system, as set out in the LULUCF Decision No 529/2013/EU.[link] This Decision goes beyond the minimum international standards, and Member States are required to report for a wider range of agricultural land use activities, including cropland and grazing land management. In addition to producing accounts on their removals and emissions, Member States are also expected to submit information on current and future measures in the LULUCF sector. These reports, received by the European Commission, provide a good overview of land use and forestry-related mitigation activities for each Member State.

***Target:*** Member States have signed up to the international obligations. In order to comply with these obligations for the second commitment period, each Member State needs to ensure that their LULUCF sector does not generate net debits when accounting for all emissions and removals in the sector.[link] If net debits were to arise, these would have to be compensated.

***Flexibility:*** Flexibility to use credits from the LULUCF sector is currently restricted. However, if any Member State incurs a net emission debit between 2013 and 2020 under the Kyoto Protocol's second commitment period, the debit would have to be covered by additional emission reductions produced in other sectors of the economy in the EU, or in third countries. With respect to Member State obligations under the EU's internal 2020 emissions reduction target, any credits generated by LULUCF cannot currently be taken into consideration as LULUCF is not included among the sectors in the EU's Effort Sharing Decision.

[1] LULUCF also includes small amounts of non-CO2 emissions.

[2] Source: JRC (to be published).

[3] Under the assumption that accounting rules for forest management showed no significant deviations from the business as usual reference levels for the commitment period.

**6. On the basis of experience with the present set of rules on accounting, targets and flexibility, how could the present rules be improved, and which aspects could be maintained and which should be rejected in future?**

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A new set of rules could be put in place, with the aim of compensating the emissions from other sectors. CO2 captured from the atmosphere and stored in the soils via digestate brings positive externalities (increased food & feed production, resilience of the agriculture sector to climate change threads, better water and nitrogen efficiency usage among the others). As metrics, the increase of organic matter in the soils could be used to measure what amount of CO2 emission are stored in the soils, even though some work should be done in order to correlate this metric (Increased Organic Matter in the soil) to the CO2 captured from the atmosphere and stored in the soils.

## 6. AGRICULTURE, FORESTRY AND OTHER LAND USE IN THE 2030 POLICY FRAMEWORK

The 2030 climate policy framework, agreed by EU leaders in October 2014, provides guidance on EU targets, policies and measures to reduce greenhouse gas emissions by at least 40 % by 2030 compared with 1990. To achieve this target, greenhouse gas emissions under the EU ETS will need to be reduced by 43 % compared with 2005. Emissions from sectors outside the EU ETS will have to be cut by 30 % below the 2005 level.

As regards CO2 emissions and removals from LULUCF, it is clearly recognised that this sector will form part of the EU's 2030 efforts. The European Commission is preparing to establish a policy on how to include LULUCF in the 2030 greenhouse gas mitigation framework. This presents the opportunity to reflect on how best to deal with emissions from agriculture, forestry and other land use.

The 2030 Communication and its impact assessment[link] identified three principal options for future policy design:

- Option 1 — LULUCF pillar: Maintain non-CO2 agriculture sector emissions in a potential future Effort Sharing Decision, and further develop a LULUCF sector policy approach separately;
- Option 2 — Land use sector pillar: Merging the LULUCF and agriculture sector non-CO2 emissions into one new and independent pillar of the EU's climate policy;
- Option 3 — Effort Sharing: Include the LULUCF sector in a potential future Effort Sharing Decision.

Option 1, the LULUCF pillar, would continue the status quo, i.e. separate treatment of LULUCF. Accounting rules, targets and appropriate measures could be further developed. Flexibilities with regard to other sectors could be considered. The major disadvantage of this option is that agricultural and LULUCF emissions (including those of agricultural soils) would continue to be addressed by different policy tools, reducing policy coherence and rendering the design of incentives for action more complex.

Option 2 ("Land use sector pillar"): Under this option a separate pillar in the EU's climate policy, the Land Use Sector, would be created by merging LULUCF and non-CO2 emissions from the agriculture sector into one new and independent pillar of the EU's climate policy. Such a sector would include all emissions and removals related to agriculture and LULUCF. It could lack the advantage of flexibility between sectors within the overall Effort Sharing Decision, but give an opportunity for a policy approach that reflects the sector's specific particularities (e.g. permanence, long time-cycles, high natural interannual variability).

Option 3 ("Effort sharing") would increase the number of sectors in the ESD and thus increase flexibility for Member States to achieve a given overall target. It would also enable an integrated approach. However, it would increase complexity and raise methodological issues, including concerns related to environmental integrity and technical compliance issues, which would have to be specifically addressed (e.g. potentially large annual fluctuations in removals and emissions).

Three crosscutting issues will have to be assessed in view of all three options: the underlying accounting rules, target setting and the flexibility rules between LULUCF and other sectors:

***Accounting:*** With respect to accounting approaches, the rules defined under the existing legislative framework (the LULUCF Decision) provide a useful starting point. However, a number of issues are still under consideration. One important discussion in the international climate negotiations is whether to continue with the activity-based accounting system for LULUCF (e.g. for forest management, cropland and grazing land management) or to shift to a land-based approach.[link]

Furthermore, under current rules, forest management is accounted for on the basis of projected forest management reference levels, grazing land and cropland management are measured against a base year level (e.g. 1990), and afforestation, reforestation and deforestation are accounted for in total. A cap limits the extent to which credits from forest management can be used to compensate debits from other activities.

Rules need to be established to ensure that additional mitigation effort is measured correctly, respecting high levels of environmental integrity; the contribution of LULUCF activities could be made dependent on certain technical conditions relating to these needs. The LULUCF Decision provides for the review of these rules and reference levels, which may need to be adapted to the changing circumstances and demands of the period between 2020 and 2030.

***Target setting:*** Accounting rules will be decisive for the extent to which emissions and removals can be counted against a target. Today's target framework (under the Kyoto Protocol) ensures that the overall sum of LULUCF activities either does not produce debits, or that any debits generated are compensated for. The target under the 2030 framework would need to build further on that principle, thereby protecting carbon stocks and ensuring the environmental integrity of LULUCF activities.

It should be noted that the European Council conclusions already provide some guidance as to how targets should be set for different Member States under the Effort Sharing Decision, mainly on the basis of GDP per capita.

***Flexibility:*** Flexibility determines the possible exchange of credits between different pillars of the 2030 climate policy framework, or possibly even between sectors within a single pillar. The choices made define which credits from LULUCF activities, after application of accounting rules, can contribute to meeting which non-ETS target.

While recognising the possible cost reductions offered by increased flexibility, the mechanism that allows flexibility between LULUCF and agriculture — or LULUCF and other sectors — would also need to ensure that only those actions are rewarded that result in additional, measurable and sustainable increases in carbon sinks.

The range of policy options will be further analysed in the context of an impact assessment, also building upon the information received from stakeholder consultations. The impact assessment will assess mitigation options for each Member State, taking into account the geographic distribution of biophysical potential. It will also assess environmental impacts (contribution to the 40 % target, bioenergy, biodiversity, resilience and other co-benefits) and economic and social impacts, and compare the options in view of all relevant parameters.

**7. How could an element of flexibility in terms of using credits from LULUCF activities in the 2030 climate policy framework be introduced in a way that fully ensures the environmental integrity of the system?**

*1000 character(s) maximum*

**8. What could be the main advantages and disadvantages of the three policy options outlined above, and which option(s) should be further developed or modified?**

*1000 character(s) maximum*

**9. Which is your preferred option? Why?**

- ○ **Option 1 — LULUCF pillar**
- ◉ **Option 2 — land use sector pillar**
- ○ **Option 3 — effort sharing**
- ○ **A combination of options**
- ○ **No preference**

**Please, provide an explanation for your choice in Question 9**

*1000 character(s) maximum*

New research results on iLUC mitigation show that only with a holistic approach reasonable modelling can be done. First publications show that under consideration of the whole agricultural sector and application of best agricultural practice worldwide, iLUC can be levelled off.
Education of farmers in developing and emerging countries is badly needed. Bioenergy can substantially contribute to create high level jobs in the regions and helps to create wealth in these areas.
Before any rule on accounting of forests is put in place, significant research efforts have to be done. In the framework of IEA Bioenergy the current worldwide efforts are highlighted and but yet more open questions arise than solutions. International research cooperation is strongly needed.

Annex

Annex.pdf

## Contact

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