Forum: European Union Council

Issue: Building Agricultural Resilience to Climate Change

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Introduction

Every year there are fewer farmers, but the demand for food is rising. The European Union faces the continuous challenge to reconcile a low environmental impact, whilst upholding the production of agricultural products. With the climate change closing in on us this is even harder. You as the delegates need to find solutions on how to change, improve or regulate the way we grow our plants.

Definition of Key Terms

Agriculture

The science or practice of farming, including cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products**.**

Climate Change

A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Greenhouse Gas (GHG)

A gas that contributes to the greenhouse effect by absorbing infrared radiation, e.g., carbon dioxide and chlorofluorocarbons.

Background Information

General Overview

Agriculture is essential for humankind – it provides the food we eat, serves as the livelihood of millions of people worldwide, and manages a large share of the landscape. In doing so, however, greenhouse gases (GHC) are released, making agriculture also a source of emissions which contribute to climate change. Since agriculture depends on natural resources and the climate to provide a suitable environment for crops to grow, climate change threatens to cause major disruptions for agriculture in the near future. Adaptation or building resilience in agriculture must therefore be prioritized alongside efforts to reduce emissions from the sector and maintain food production. Balancing these competing interests presents a significant policy challenge.

Greenhouse gas emissions from agriculture

Various types of GHGs are released during agricultural production. Of the six official GHGs that are accounted for under the international climate change treaty, the United Nations Framework Convention on Climate Change (UNFCCC), only methane (CH4) and nitrous oxide (N2O) are accounted for as agriculture emissions. These gases are emitted during activities such as livestock production (which releases a large amount of CH4 from manure storage) and spreading of manure or chemical fertilizers on fields to nourish the crops (which releases N2O emissions).

Additionally, emissions from managing agricultural soils, land use change, and forestry activities are accounted for separately under the Land use, land use change and forestry (LULUCF) sector of the UNFCCC. Agriculture is a source of carbon dioxide (CO2), N2O, and CH4 emissions, resulting from management activities, such as the ploughing of soil (which alters the carbon stored there and releases CO2) and draining of wetlands to use for agriculture (which releases large amounts of CO2 since the organic soils rapidly decompose with lower water tables). Forestry also results in emissions when wood products are harvested (resulting in CO2 releases).

Agriculture and forestry are unique sectors, however, because they act not only as sources of emissions but also as sinks, with the ability to remove atmospheric carbon by soaking it up and storing it above or below ground in the plants and soil. This natural process allows these land-based sectors to mitigate global emissions to a certain extent, though processes such as deforestation of tropical rainforests and large-scale grassland conversion reduce their potential.

Agriculture and forestry act as a GHG source and sink

Plants remove atmospheric carbon and store it above and below ground, while agricultural practices and deforestation contribute to varying levels of GHG emissions.

Agriculture accounts for approximately 10% of the EU's total GHG emissions. In comparison to other sectors, transportation comprises nearly 20% and electricity and heat generation in the EU accounts for over 25% of the total GHG emissions. However, agriculture also contains "hidden emissions" that are attributed to other sectors, e.g., CO2 emissions from fossil fuel and electricity used for machinery, drying crops, and the manufacture of fertilisers / pesticides are accounted for by the energy sector.

In addition, the type of emissions from agriculture and the number of actors / scope of activities make it a challenging sector for emissions reductions. Methane and nitrous oxide emissions are particularly potent GHGs – CH4 has 20 times more heat-trapping potential than CO2 and N2O has 300 times more. The activities which create these emissions are also spread throughout the EU-28 and done by different actors of varying sizes. Thus, unlike a power plant which can install a piece of equipment to help reduce emissions by a certain amount, each farm grows different things and the same change in management style may not cause the same emissions reduction when applied in different locations by different individuals.

Agriculture also needs to adapt to climate change

Agriculture is a nature-based, climate-dependent sector which will experience multiple impacts from climate change. Some of the key anticipated impacts of climate change for agriculture will include decreased annual rainfall, increased frequency of droughts and flooding, and increased risk of pests and diseases. Thus, it is important that agriculture builds the capacity to adapt to climate change in order to reduce negative impacts.

Various opportunities exist for mitigation and adaptation in agriculture. Many agricultural practices which are beneficial for mitigation also have positive contributions for water, soil and biodiversity protection, as well as for adaptation. There are various synergies which exist between adaptation and mitigation activities in agriculture. For example, including grasses in crop rotations decreases emissions while providing year-round cover of the ground, thus reducing soil erosion and increasing the retention of water in the soils. Many actions exist that can reduce the impact the sector on climate change while maintaining productivity levels to meet food demand.

Major Countries and Organizations Involved

Food and agricultural organization (FAO)

Department of the UN that concentrates on eliminating hunger through agricultural means.

Timeline of Events

Date	Description of event
105,000 years ago	First signs of agriculture
Early 19th century	The begin of modern science of plant nutrition
1910	Agricultural boom because of Haber-Bosch process
1979	First World Climate Conference (WCC)
1994	UNFCCC enters into force
1997	Kyoto Protocol adopted
2010	Climate Smart Agriculture is introduced

UN Involvement and Treaties

- United Nations Framework Convention on Climate Change **(UNFCCC) 1992**
- Paris Agreement **(UNFCCC) 2016**

Previous Attempts to solve the Issue / Possible Solutions

Since there is great diversity in natural conditions and farming systems, the choice of the most appropriate practices will vary according to context and depend on specific agronomic, environmental and climatic conditions. Management options can be divided into several key categories: grassland management, cropland management, land use change, livestock management, efficient energy use, and efficient water use. In general, the most relevant measures include improved manure management, increased efficiency of nitrogen inputs, and improved soil management, including the protection of soils rich with organic matter.

Bibliography

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