



Carbon Reduction in Agriculture

Agriculture's Carbon and Methane Emissions

Since 1990, gross U.S. greenhouse gas (GHG) emissions have increased by 2%. GHG emissions attributed to agriculture account for only 10% of total emissions in the United States. Agricultural activities emit GHG in a variety of ways. These include emissions from livestock, agricultural soils, and the production of commodities such as rice. Management of agricultural soils accounts for just over half of the greenhouse gas emissions from the agriculture sector. Example practices include the application of synthetic and organic fertilizers, the growth of nitrogen-fixing crops, the drainage of organic soils, and irrigation practices, all of which can result in the emission of nitrous oxide. Livestock, especially ruminants such as cattle, produce methane as part of their normal digestive processes. This process, called enteric fermentation, represents over a quarter of the emissions from the agriculture sector. The management of livestock manure also contributes to methane and nitrous oxide emissions. Manure treatment and storage methods vary, and thus affect how much of these gasses are produced. Manure management accounts for about 12% of the total greenhouse gas emissions from the agriculture sector in the United States.

Carbon Sequestration in Agriculture

Carbon sequestration in the agriculture sector refers to the capacity of agricultural lands and forests to remove carbon dioxide from the atmosphere. Carbon dioxide is removed from the atmosphere and converted to organic carbon through the process of photosynthesis. As organic carbon decomposes, it is converted back to carbon dioxide through the process of respiration. Numerous farming practices can sequester carbon and reduce GHG emissions by enhancing carbon storage in soils; preserving existing soil carbon; and reducing carbon dioxide, methane and nitrous oxide emissions. The agricultural practices of conservation tillage, organic production methods, cover cropping, and rotating crops can all drastically increase the rate of carbon sequestration. Altering grazing practices to include rotational grazing and the seasonal use of rangeland can reduce emissions and protect the sequestration abilities of soils and grassland. The conversion of marginal cropland to trees or grass also works to maximize carbon storage. In addressing methane emissions, covered lagoons and complete mix and plug flow digesters can use anaerobic digestion to convert methane to energy while preventing it from being emitted into the atmosphere. Improving efficiency through practices like GPS-based precision farming and drip or center pivot irrigation systems can further reduce emissions while conserving energy.

Agriculture and the Environment

Modern agricultural practices prioritize efficiency and rely heavily on technology. The innovative practices that farmers and ranchers use make agriculture a sustainable industry, and one that is proactively working to preserve precious natural resources, limit GHG emissions, sequester carbon, and find alternative solutions to addressing the threats of climate change.

