

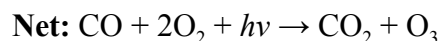
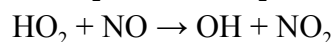
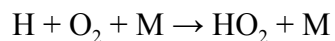
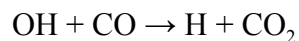
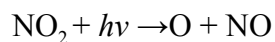
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ATOC 3500/CHEM 3151

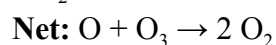
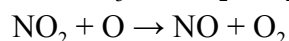
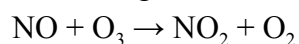
Impacts of Animal Agriculture

- Agriculture
 - Animal agriculture is the second largest contributor to human-made greenhouse gas (GHG) emissions after fossil fuels and is a leading cause of deforestation, water and air pollution and biodiversity loss.
 - On a global scale, agriculture emits about 47 percent and 58 percent of total anthropogenic emissions of methane and nitrous oxide, respectively.
 - Nitrous oxide from soils and methane from enteric fermentation constituted the largest sources of non-CO₂ greenhouse gas emission from agriculture in 2005, 38 percent and 32 percent respectively.
 - Agricultural activities contribute directly to emissions of greenhouse gases through a variety of processes, including enteric fermentation in domestic livestock, animal manure management systems, rice cultivation, agricultural fertilization and soil management, and burning of agricultural residues. Methane and nitrous oxide were the primary greenhouse gases emitted by agricultural activities.
 - Problem in America due to high animal-based diets. In addition to the actual methane and NO_x produced by cattle and other livestock, there is pollution from transportation, deforestation, and electricity usage.
- Cattle and Livestock
 - In the United States, methane from the normal digestive processes of animals totalled 164.3 million metric tons of CO₂ in 2014.
 - “Livestock induced” emissions (extensive clearing of trees for agricultural expansion) amount to roughly 0.65 gigatons of CO₂ per year.
 - Beef cattle were responsible for about 44 percent of the total nitrous oxide emissions from manure, followed by dairy cattle (31 percent), and swine (11 percent), with approximately 100 million metric tons of CO₂ annually.
 - Replacing beef with plants would reduce that figure 96 percent, bringing it down to just 73 pounds of CO₂.
 - When manure sits for more than a couple days in an anaerobic (without oxygen) environment, methane will likely be produced. About one-half of all manure methane emissions are attributed to dairy cattle, followed by swine (19 percent), beef cattle (5 percent), and poultry (5 percent)
- Chemistry
 - Methane is 34 times more potent than carbon dioxide over 100 years
 - The Photolysis of NO₂ is the only known way of producing tropospheric ozone

- **Tropospheric:** NO_x gases react to form smog and acid rain, fine particulate matter, and tropospheric ozone. All have serious health effects such as respiratory irritation, impairment, and discomfort



- **Stratospheric:** NO_x reactions lead to stratospheric ozone depletion, and it turns, increases global warming.



Global Warming Potentials of Greenhouse Gases

(when compared to CO ₂)		
Greenhouse Gas	GWP After 20 Years	GWP After 100 Years
Carbon Dioxide	1	1
Methane	72	25
Nitrous Oxide	289	298

Sources

- <https://climatenexus.org/climate-issues/food/animal-agricultures-impact-on-climate-change/>
- <https://aglifesciences.tamu.edu/baen/wp-content/uploads/sites/24/2017/01/Contribution-of-Greenhouse-Gas-Emissions.-Animal-Agriculture-in-Perspective.pdf>
- <http://www.icopal-noxite.co.uk/nox-problem/nox-pollution.aspx>
- Atmospheric Chemistry. Ann M Holloway and Richard P Wayne. RSC Publishing 2010
- <https://whatsyourimpact.org/high-global-warming-potential-gases>

