What is the Impact of Animal Production on The Environment?

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One of the biggest topics of animal agriculture shown through the media focuses on the impacts animal production has on the environment. Each and every human has made an impact on the environment and the world in which we live, so it is no surprise this is the same case with animals.

Below are some common questions asked pertaining to the environmental impacts of the animal agriculture industry, and answers to those questions.

Do animals make greenhouse gases?

Each and every living creature produces greenhouse gases (GHG). Greenhouse gases are gases in the

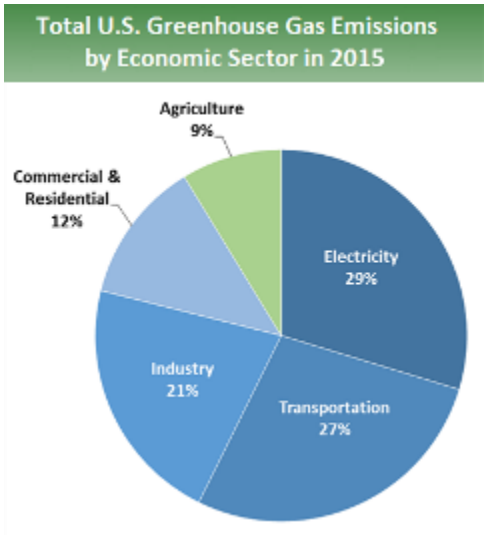
earth's atmosphere and can be produced in nature and through human industry. An increased amount of GHG generates high temperatures on earth. The most abundant GHG are carbon dioxide, methane, nitrous oxide and fluorinated gases.

The amount of greenhouse gases that agriculture and farming produce varies around the world. This is because each livestock production system utilizes its resources differently. Agricultural systems are often categorized into two types of systems: **extensive** farming and **intensive** farming.

Extensive farming is a type of agriculture that is mainly a pasture-based and land-based system. Extensive farming uses low labor and input resources. This type of farming utilizes natural

resources and results in lower yield per unit of land than intensive farming. In beef cattle production, for example, cattle in an extensive system would graze in a pasture.

Intensive systems have more concentrated operations and are often more mechanized. This system uses higher amounts of labor and resources per unit of land, but it also produces greater yield per unit of land than extensive farming systems. A feedlot is an example of an intensive system for beef cattle production.



Each of these systems occurs all around the world and each has an environmental impact. The challenge for global livestock production is to improve environmental sustainability and continue to reduce greenhouse gases. Currently in the United States, agriculture accounts for nine percent of the total greenhouse gases emitted.

The largest methane (CH4) source emitter in the world is from livestock and manure emissions combined. Most of this methane is a result of manure storage and enteric fermentation, which is methane produced in the digestive tract of an animal. Some farmers in California are utilizing an invention called the methane digester to have the methane be used as another source of energy. Read about this cool sustainable work here!

Farmers are now using a process called Precision Feed Management which allows the farmer to feed his animals a more precise amount of nutrients so there is greater feed use and less waste in the form of uneaten food and animal manure. When animals are better able to use the food they eat, fewer nutrients are released into the environment.

What's with the manure?

If you've ever been to a farm, you might have noticed that some of the smells take some getting used to. One smell is manure, or animal waste, which contributes to the farm's environmental impact. As

indicated above, manure can be a large source of GHG especially from methane and nitrous oxide. Farmers have different ways of dealing with manure and the odor that comes from these wastes.

To read more about what farmers doing with manure, click here!

How do farmers minimize the impact?

A term you might hear when talking about climate change is carbon footprint. A carbon footprint is the amount of carbon that each person uses and emits into the atmosphere. People are often encouraged to lower their carbon footprint by recycling or walking instead of driving. We all have a responsibility to the earth to keep it clean and use fewer resources. By improving its efficiency, the livestock industry can work to reduce carbon emissions and conserve resources.

To see how farmers are helping the environment, click here.

References

Koncz, Péter. "Extensive grazing in contrast to mowing is climate-friendly based on the farm-scale greenhouse gas balance." Agriculture, Ecosystems & Environment 240 (2017): 121-34. Web.

Older text:

Each one of us has an impact on the environment and the world in which we live. Growing food and raising animals also uses resources from the earth. Humans impact the environment through deforestation, agricultural and livestock activities, urbanization and burning fossil fuels (Shepherd, 2011).

Do animals make greenhouse gases?

Each and every living creature produces greenhouse gases (GHG). Greenhouse gases are gases in the earth's atmosphere and can be produced in nature and through human industry. An increased

amount of GHG generates high temperatures on earth. The most abundant GHG are water vapor, carbon dioxide, methane, nitrous oxide and ozone.

The amount of GHG that agriculture and farming produces around the world is different. This is because each livestock production system is different in the way it uses resources. Agricultural systems are often categorized into two types of systems: extensive farming and intensive farming.

Extensive farming is a type of agriculture that is mainly a pasture-based and land-based system. In beef cattle production, for example, cattle in an extensive system would graze in a pasture. Intensive systems have more concentrated operations and are often more mechanized. A feedlot is an example of an intensive system for beef cattle production.

Each of these systems occurs all around the world and each has an environmental impact. The challenge for global livestock production is to improve environmental sustainability within each region rather than prescribing a one-size-fits-all global system (Capper, 2011). Currently in the United States, agriculture accounts for seven percent of the total GHG emitted.

Carbon dioxide from livestock production is a result of fuel use from equipment and changes in the carbon content of soil, such as, crops, deforestation and direct land use by animals (Hermansen et al., 2011).

Livestock production is the largest methane source emitter in the world and the third largest in the United States (Shepherd, 2011). Most of this methane is a result of manure storage and enteric fermentation, which is methane produced in the digestive tract of an animal (Hermansen et al., 2011).

The source of nitrous oxide in livestock production is the application of manure and artificial fertilizers on fields and from ammonia losses during and after the growing season (Hermansen et al., 2011).

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How do animals affect water quality?

Water is a scarce and valuable resource essential to human and animal life. The consumption of animal products contributes to more than one-quarter of the water footprint of humanity. Water for livestock production is used for drinking, irrigation to grow crops/ pasture and for different animal services such as cleaning. The water needed to produce feed is the major factor behind the water footprint of animal products (Hoekstra, 2012).

Animals can negatively affect water quality by having free access to water sources where they are able to deposit waste and cause the water to become cloudy from stirring up mud. Waste from animals can be dangerous because it carries harmful bacteria which people may drink.

Globally, 3.2 percent of human deaths are caused by unsafe water. This problem is especially prevalent in developing countries. However, only a small portion of these deaths are related to bacteria from livestock (McAllister et al., 2012).

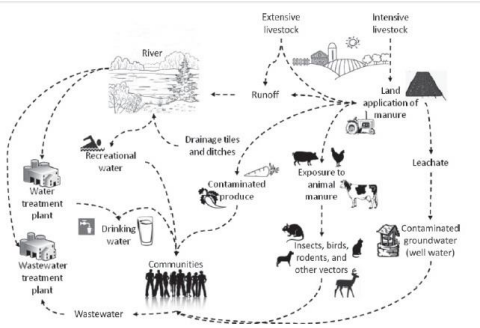

Figure 1. Avenues of flow of microbial contaminants from intensive and extensive livestock operations to surface and groundwater. Primary sources include 1) runoff from snowmelt or rainfall events, 2) land application of manure, and 3) leachate from livestock operations into groundwater sources. Note that proper treatment of wastewater and drinking water plays a critical role in preventing community infections. Pathogens acquired from recreational water, contaminated produce, or contact with livestock or wild vectors are not precluded by these controls.

Photo courtesy of Animal Frontiers

Water contamination can occur in many different ways. In extensive systems, livestock often have access to bodies of water where they are able to deposit waste. This waste travels downstream and has direct contact with humans. In intensive production systems, bacteria can enter water sources during heavy rainfalls that might result in an overflow of the manure catchment basin or from manure that has been put on fields as fertilizer (McAllister et al., 2012).

The presence of bacteria in water can also result from urban wastewater, sewage, septic tank discharge and waste from wildlife (McAllister et al., 2012).

Manure, odor and dust

If you've ever been to a farm, you might have noticed that some of the smells take some getting used to. One smell is manure, or animal waste, which contributes to the farm's environmental impact. As indicated above, manure can be a large source of GHG especially from methane and nitrous oxide. Farmers have different ways of dealing with manure and the odor that comes from these wastes.

The use of biogas or methane digesters on farms not only serves as a source of energy for the farm, thereby decreasing the amount of fossil fuels, but also allows a reduction in methane, CH_4, and nitrous oxide, N_2O, and a decrease in the use of synthetic fertilizers (Hermansen et al., 2011). When manure is stored in a digester, it is covered, which prevents much of the odor from escaping into the air.

When farmers put manure on their fields as a form of fertilizer, they can use several different methods to reduce odor and better use the nutrients in manure. By using a drag hose and injection to spread manure, odor-causing compounds are integrated into the soil and cannot escape into the environment. This helps to reduce the amount of nitrous oxide and ammonia that is released (Wright et al., 2011). An Odor Management Plan (OMP) helps farmers assess odor issues on their farm and discover how best to alleviate the issues.

Farms can also cause dust and dirt particles to be released into the air. These particles are called volatile organic compounds (VOCs). Volatile organic compounds come from items such as manure, bedding and dust. When farmers practice manure management and odor management they are able to reduce the amount of VOCs emitted.

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We all have a responsibility to the earth to keep it clean and use fewer resources. By improving its efficiency, the livestock industry can work to reduce carbon emissions and conserve resources (Capper, 2011). See how farmers are stewards of the land.