

WASTE MANAGEMENT

Livestock farms employ various manure management practices to handle and utilize animal waste effectively. Management practices vary by location and animal species, but include composting, anaerobic digestion, manure storage structures (such as lagoons), and land application. Technology such as methane digesters can even transform animal waste into biofuel to serve as a renewable energy source.



Without livestock manure, there isn't a source of organic fertilizer to supplement soil nutrients for crop production.



Perspective

Technology and research overcome the negative impacts of waste management from livestock.

The Environmental Impacts of Livestock

WATER POLLUTION

The EPA works to minimize water pollution from CAFOs through a combination of regulatory oversight, technical assistance, enforcement, and collaboration with stakeholders to promote sustainable livestock production practices. Farmers are required to obtain permits and implement best management practices.



The EPA collects regular data on CAFO operations to assess compliance of farms and to identify areas for improvement.



Perspective

The regulatory program for CAFOs provides sufficient mitigation to avoid water pollution from livestock.

The Environmental Impacts of Livestock

GREENHOUSE GAS EMISSIONS

While methane is more potent than carbon dioxide in regard to global warming, it is different. Once emitted, methane has a half-life of about 10 years, while carbon dioxide has a half-life of 1,000 years. What many people don't realize is that livestock-related greenhouse gases are distinctively different from fossil fuel-related gases. After about 10 years, the methane is converted back into CO₂ through hydroxyl oxidation. The carbon that is emitted by our livestock is recycled carbon.



If livestock herds remain constant, or cattle numbers decrease over time, no additional carbon is being added to the atmosphere.



Perspective

We don't need to limit cattle production. We need to focus on research and technology so that cattle numbers don't need to increase with the population.

The Environmental Impacts of Livestock

WASTE MANAGEMENT

Poor manure management practices contribute to water pollution, soil degradation, and greenhouse gas emissions. Summer is the peak season for the formation of harmful algal blooms (HABs). Algal blooms occur during periods of warm temperatures, lots of sun, and high nutrient levels in water. High levels of nutrients in water can come from farm fertilizers, animal manure, or storm water runoff. Livestock manure also emits odors affecting local communities.

Perspective
The odors emitted by livestock farms ruin local air quality and negatively impact local residents.



Many jurisdictions have regulations governing the management and disposal of livestock manure to protect water quality and public health.

The Environmental Impacts of Livestock

WATER POLLUTION

Livestock farms, particularly CAFOs (concentrated animal feeding operations), produce large amounts of manure. Animal manure contains nitrogen, phosphorus, and pathogens that can leach into the soil and contaminate groundwater or be washed into nearby water bodies through runoff. Excessive nutrient levels in water bodies can lead to eutrophication, causing algal blooms, oxygen depletion, and harm to aquatic ecosystems.

Perspective
The risk of water pollution from CAFOs is too high to justify having these large livestock farms.



The EPA developed the definition of a CAFO in order to identify and monitor the farms posing the greatest risk of polluting water resources.

The Environmental Impacts of Livestock

GREENHOUSE GAS EMISSIONS

Livestock farming contributes to greenhouse gas emissions primarily through the release of methane and nitrous oxide, as well as carbon dioxide indirectly. Ruminant animals release methane through their digestive processes and all livestock manure produces methane and nitrous oxide. There are also greenhouse gas emissions from land use change, feed production, and energy use.

Perspective
Methane greenhouse gas emissions from livestock warrant the reduction of livestock farming.



Methane is a potent greenhouse gas with a higher warming potential than carbon dioxide over a 20-year timeframe.

The Environmental Impacts of Livestock

WATER USE

The water footprint of a food looks at three types of water. "Green" water is rain water, "blue" water is surface or groundwater used for irrigation, and "gray" water is for pollution management. Gray water is the amount of freshwater needed to dilute pollutants from crop growth. While animal-source foods have the largest water footprint, it's important to consider that green water accounts for the largest portion of the water footprint, particularly for cattle and sheep who spend most of their life cycle eating grass on range lands.



There is the same amount of water on Earth today as there was when the Earth was formed.



Perspective

Rainwater will fall and cause grass to grow whether or not livestock eat the grass.

The Environmental Impacts of Livestock

LAND USE

Cattle, sheep, and goats are ruminants. They have unique digestive systems that allow them to digest and gain nutrients from grasses and other forages that humans (and most other animals) cannot. Grazing animals can convert many otherwise unusable plants and byproducts to quality protein. Grazing is especially vital in arid regions of the world where water is insufficient for the growth of other crops. These marginal lands can be considered low value due to poor soil, steep terrain, low water availability or other undesirable characteristics.



86% of global livestock feed intake in dry matter consists of feed materials that are not edible for humans.



Perspective

Livestock convert unusable nutrients into high protein foods such as meat, milk, and eggs. Only 35% of land used for livestock could be converted to cropland.

The Environmental Impacts of Livestock

WATER USE

A *water footprint* is a metric to measure the amount of water consumed to produce goods and services along the full supply chain. Animal-source foods have a larger water footprint than plant-source foods (per unit produced). Livestock require water for drinking and hydration, the growth of feed crops, food processing, and waste management. Water availability varies by region throughout the world. Some areas are “water rich” and others are “water poor.”

Perspective

Transitioning towards a more plant-based diet can help reduce water consumption and alleviate pressure on freshwater sources.



Agricultural production accounts for 92% of global water use. Irrigation accounts for the biggest portion of agricultural water use.

The Environmental Impacts of Livestock

LAND USE

On a global scale, 25% of agricultural land is used to produce food crops for direct human consumption. This includes the production of fruits, vegetables, beans, rice, grains, etc. The remaining 75% of agricultural land is used to feed livestock such as cattle, pigs, poultry, sheep, and goats. Livestock are raised throughout the world for meat, milk, and eggs. Livestock land use includes range and pasturelands used for grazing as well as croplands used to grow grain commodities that are fed to livestock (rather than people).

Perspective

Raising livestock for food requires too much land. We should be using that land to grow food for humans.



Only 25% of our Earth's surface is land. One third of Earth's land surface is inhospitable (polar regions, deserts, or rock). The remaining two thirds of land is where we live, recreate, and produce our food.

The Environmental Impacts of Livestock

TECHNOLOGY

Livestock Feed Additives

Research into feed additives such as methane inhibitors or enzymes that improve feed efficiency can help reduce methane emissions from livestock. By improving digestion and nutrient utilization in animals, these additives can decrease the amount of methane produced per unit of livestock product.



TECHNOLOGY

Grassland Management Tools

Grazing management software and GPS-enabled fencing systems allow farmers to implement rotational grazing practices more effectively. Rotational grazing helps improve soil health, increase carbon sequestration, and reduce greenhouse gas emissions by promoting healthier pasture ecosystems and minimizing overgrazing.



TECHNOLOGY

Methane Digester

A methane digester is a system that captures methane (a greenhouse gas) from manure and converts it to renewable energy. These systems reduce GHG emissions, generate renewable energy, manage animal waste, and reduce odor from farms.



TECHNOLOGY

Precision Livestock Farming

PLF utilizes various technologies such as sensors, GPS tracking, and data analytics to track animal health, feed consumption, and environmental conditions. Improvement in efficiency on a farm equates to lessening the environmental impact of the products the livestock produce.



GEOGRAPHY & CLIMATE

Some geographic areas around the world rely heavily on livestock for their survival and could not adapt to life without livestock due to climate (drylands, deserts, mountainous regions, etc.). In these areas, livestock play a crucial role in providing not just food but also other resources like leather, wool, and transportation, contributing significantly to the livelihoods and economies of the people living there.



BYPRODUCTS

Livestock are raised primarily for their meat, milk, or eggs. They also provide hundreds of other products we use on a daily basis. Examples include wool, leather, gelatin, feathers, tallow, medical products, cosmetics, lanolin for lotions, pet food, adhesives, and so much more.





Technology helps manage grazing systems more efficiently. Grazing is only beneficial to the ecosystem of grasslands if it is managed properly to avoid the damage of overgrazing.



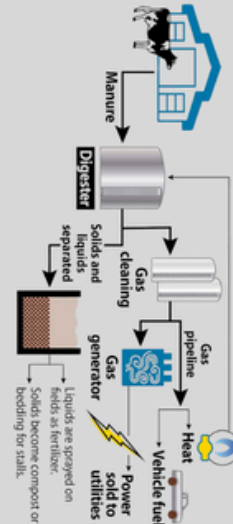
There is ongoing research to study the methane emissions from cattle. Researchers are finding ways to change livestock production practices (feeding routines, etc.) to decrease methane emissions.



Electronic collars function similar to a fitbit. They monitor movement, rumination, and other factors measuring health. They alert the farmer to changes.



GPS tracking systems help locate and monitor livestock that are grazing in large open spaces.



Leather



Pet Food



Wool



Cosmetics



Lotion



Gelatin



Adhesive



Pharmaceuticals



Feathers



The ability to grow crops for food is not equitable throughout the world. Geography and climate plays a role. Economic stability and development also play a role. While many areas in the United States and other developed countries have adequate access to a large variety of plant-source food to create a healthy diet, other parts of the world do not have the same opportunity.

ECOSYSTEM MAINTENANCE

Livestock can provide ecosystem services, such as grazing for fire prevention and habitat management. Overgrowth of plants increases the risks of dangerous wildfires, particularly in the Western United States where the climate can be arid.



UPCYCLING OF WASTE

The food processing industry produces a lot of waste. For example, almond hulls and shells from almonds, cotton seeds from cotton plants grown to make fabric, beet pulp from sugar beets, and more. Without livestock eating these byproducts, they would be in landfills.



SOIL NUTRIENTS

Livestock contribute to sustainable agricultural practices through manure for fertilization, rotational grazing, and weed control. Without livestock, agricultural systems would need to adapt to alternative methods of improving soil fertility through the application of synthetic soil nutrients (fertilizers).



CULTURE & TRADITIONS

Livestock are integral to many cultural practices, traditions, and cuisines around the world. Their absence could lead to shifts in cultural identity and practices. Many products beyond food, such as leather, wool, and gelatin, are derived from livestock. Their absence would require alternative materials or production methods.



HUMAN NUTRITION

Incorporating animal-source foods in moderation (following dietary guidelines) can contribute to a balanced and nutritious diet that meets individual nutritional needs. Animal-source foods provide all essential amino acids and contribute to an overall feeling of fullness and satisfaction.



ECONOMY

The livestock industry contributes significantly to the global economy, including farming, processing, distribution, and related industries. A lack of livestock would lead to economic changes, affecting livelihoods and jobs. Livestock farming supports the livelihoods of millions of people, especially in rural areas.





Almond Hulls



Cottonseed



Beet Pulp



Fruit and Vegetable waste

Best management practices for grazing includes not leaving animals on land too long. If livestock are managed properly, they improve grazing lands by promoting new plant growth.



If rangelands are over grazed, it leads to plant loss and desertification.



Farming and ranching are not just economic activities but also integral aspects of American heritage and culture, shaping social, environmental, and culinary landscapes.



Cattle hold a significant and multifaceted role in Indian culture, deeply embedded in religious, social, economic, and symbolic contexts.

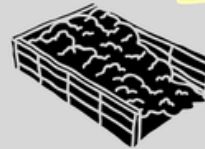


Historically, the Navajo Churro sheep served as a vital source of livelihood for the Navajo people. Sheep provided wool for weaving and meat for sustenance, contributing to the economic well-being of Navajo families and communities.

The production of synthetic fertilizers involves complex chemical processes and often relies on the availability of raw materials such as natural gas for nitrogen production and phosphate rock for phosphorus production.



Nutrients in the soil are consumed as plants grow. They can be replenished in a variety of ways.

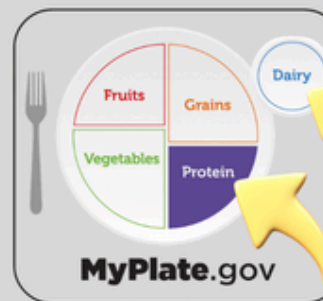


Livestock manure is a natural source of soil nutrients that can be spread on fields to increase soil fertility and crop growth.



The livestock sector is a pillar of the global food system and a contributor to poverty reduction, food security, and agricultural development. According to the FAO, livestock contributes 40% of the global value of agricultural output and supports the livelihoods and food and nutrition security of almost 1.3 billion people.

[The World Bank](#)



All animal-source foods fit in the protein and dairy food group. Some plant-source foods are also found in this food group.