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Sustainable Agriculture: A Modern Concept

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An method to farming known as "sustainable agriculture" places more emphasis on renewable and natural resources than on artificial inputs like pesticides and fertilizers. Sustainable agriculture aims to "meet the needs of present and future generations, while ensuring profitability, environmental health, and social and economic equity," according to the Food and Agriculture Organization of the United Nations. However, because this approach is not subject to much governmental scrutiny, farms are free to refer to themselves as "sustainable" without providing any supporting data.

Sustainable Agriculture

Sustainable agriculture is distinguished by its goal of doing the opposite, whereas traditional agriculture significantly stresses the environment. Sustainable agriculture, according to the National Institute of Food and Agriculture of the USDA, attempts to preserve the environment, preserve soil fertility, and even increase our base of natural resources. In order to produce enough food to meet human requirements, sustainable agriculture aims to: 1) boost farmers' economic profitability; 2) promote environmental stewardship; and 3) improve the welfare of farmers, their communities, and their animals.

Why Is Sustainable Agriculture So Important

Food systems study indicates that protecting our natural resources, particularly our ability to generate food, is crucial as the consequences of climate change and environmental harm intensify. The goal of sustainable agriculture is to generate sufficient short-term yields without causing long-term environmental damage.

Due to the negative effects that factory farms, also known as concentrated animal feeding operations (CAFOs), which can house up to 1,000 animals in cramped quarters, can have on the environment and public health, the principles of sustainable agriculture do not support the housing of animals in these facilities. Government regulations surrounding the term "sustainable" are, however, lax, making it difficult to determine whether a farm claiming to be sustainable is adhering to any or all of the principles of this farming philosophy.

What Are Seven Sustainable Agricultural Practices

The general goal of sustainable agriculture methods is to preserve the longevity and health of farms.

Adopting Agroforestry Practices: The process of incorporating trees into fields used for raising cattle or crops is known as agroforestry. Agroforestry has several advantages, such as preventing erosion, offering wind shelter and shade, and preserving the food sources and habitats of nearby wildlife.

Applying Integrated Pest Management (IPM): The strategic approach to pest management known as "Integrated Pest Management" combines chemical pesticides with biological

controls, such as naturally occurring parasites. Examples include developing healthy crops that are resilient enough to fend off pests, employing disease-resistant plants, introducing natural predators to control parasites, or even planting neighboring plants expressly to draw bugs away from crops.

Integrating Livestock and Crops: Many farms that adhere to the sustainable agriculture philosophy graze cattle and cultivate crops on the same plot of land. Using livestock can help cut down on the amount of synthetic fertilizers needed because animal dung gives plants nutrition. Ecologists discover that grazing cattle also have negative effects on the ecosystem, such as higher greenhouse gas emissions and the extinction of species and biodiversity.

Managing Whole Systems and Landscapes: Utilizing the entire land, including less intensively cultivated or even uncultivated parts, is another method of sustainable agriculture. For example, natural vegetation or prairie plants can benefit the area animals and soil quality. Expanding farms, particularly those with grazing cattle, tends to worsen wild landscape degradation and deforestation, which further reduces biodiversity.

Planting Cover Crops: In order to improve the soil and lessen erosion, cover crops are planted in succession with other crops. Based on data from applications in the United States, cover crops may currently be marginally reducing yields. Because cover crops suppress weeds and help manage pests, they can help lower the demand for synthetic pesticides.

Reducing Tillage: The process of disturbing soil in order to plant it is known as tillage, and it can be carried out by turning, excavating, or stirring the soil. Reducing tillage enhances soil health and water quality while reducing soil erosion.

Rotating Crops and Increasing Diversity: Crop rotation is the practice of successively planting various crop varieties in a single field. This increases soil biodiversity, which improves soil health and production and may eventually result in higher profits or act as a buffer against agricultural losses.

What Are Some Examples of Sustainable Agriculture

There are numerous approaches that fall under the umbrella of sustainable agriculture, each with its own methodology and emphasis. All of these methods, nevertheless, are fundamentally geared toward becoming more ecologically conscious than industrial farming. Once more, farms that use this label may or may not be carrying out the procedures because the phrase is unregulated.

Organic Agriculture: However, organic farming is governed in the United States. Farmers must follow the guidelines set forth by the USDA's National Organic Program, which controls the use of pesticides and fertilizers—virtually none of which may be synthetic—in order for their agricultural system to be certified organic.

Regenerative Agriculture: Regenerative agriculture usually incorporates livestock into a farm in an effort to stop the deterioration of the soil and farms. Nonetheless, the phrase has a wide range of interpretations and is becoming frequently used as a marketing term on grocery store labels. According to climate researchers, there is insufficient data to substantiate the assertion that regenerative agriculture can lower greenhouse gas emissions.

Permaculture: A system known as permaculture aims to cohabit peacefully with all living things, including people, animals, and the surrounding environment. There are several contexts in which permaculture can be used, including urban, suburban, and rural areas.

Sustainable Agriculture Versus Industrial Agriculture

In the past century, the United States' food production has been progressively dominated by industrial agriculture. Large-scale farming is defined by the use of vast areas of land, high yields and maximum efficiency, heavy use of pesticides and fertilizers, and farm animals kept in CAFOs. Furthermore, the majority of crops grown in the industrial system are not used to feed people, but rather to feed animals or produce biofuel.

The Impacts of Industrial Agriculture: Despite producing a lot of food, industrial agriculture is not without its issues. The effects of this arrangement on laborers, animals raised for food, and neighboring populations are extensive.

Environmental Impacts: Air pollution, soil erosion, and water contamination are all caused by industrial agriculture. More than 1 billion tons of manure are produced annually by the animals kept in CAFOs in the US alone—five times more than the country's population. Manure from industrial animal rearing is one of the main causes of air pollution in addition to its effects on the safety and quality of water. A number of pollutants, including ammonia, hydrogen sulfide, methane, and particulate matter, are released when the manure breaks down. When inhaled, these compounds can lead to severe ailments such as chronic lung disease, chronic bronchitis, or even death. They are discharged into the air.

Manure management is identified by the Environmental Protection Agency as a major source of methane emissions, which is 27 times more potent than carbon dioxide as a greenhouse gas during a 100-year period. Beyond these evident risks to human health, manure also contributes to climate change.

Public Health: On industrial farms, the main crops farmed are corn, soy, wheat, and cotton. The main uses of these subsidized crops are biofuels, animal feed, and, to a lesser extent, ultra-processed foods, all of which contribute to obesity and ill health. Because factory farms' cramped confines make illness more likely, farm animals kept in CAFOs are often given antibiotics to prevent disease. Antibiotic resistance genes have been found to proliferate as a result of the usage of antibiotics in animal feed, and this has decreased the ability of antibiotics to treat illnesses in humans. Those who labor in industrial agriculture may also suffer negative effects from it. Toxic gasses, diseases, and pesticides are frequently exposed to farmworkers more frequently than others. These laborers also seldom earn more than the minimum wage and have little access to healthcare.

The Benefits and Limits of Efficiency

The main justification for industrial agriculture is that it is the most effective means of swiftly and affordably producing vast quantities of food. The drawback is that farmers and producers are significantly less likely to take into account how farming practices affect wildlife, livestock, and the condition of the soil when they place a strong priority on yields.

What Are the Benefits of Sustainable Agriculture: Sustainable agricultural farms typically put an emphasis on healthy soil and use less artificial fertilizers and pesticides.

Animal Welfare: The goal of many sustainable agriculture farms is to house cattle in smaller groups and provide them with more space. The size of a group has a beneficial impact on social behavior, which enhances relationships between animals and between workers. The protection of pollinators through food grown without the use of pesticides and fertilizers also benefits local wildlife populations. Manure farms that manage and apply it correctly help the neighboring towns' air and water pollution.

Again, though, people shouldn't assume that animals raised on "sustainable" farms receive good treatment because sustainable agriculture is not highly regulated.

Environment: The ecosystem is protected when chemical fertilizers and pesticides are used sparingly and under control. Increased crop diversity can aid in lowering soil erosion and replenishing nutrients that have been lost due to industrial activities.

Local Economies and Workers: The working conditions and general welfare of those employed in sustainable agriculture are usually safer and less demanding. The focus placed by sustainable agriculture on diverse yields can also result in increased earnings, which usually translates into higher wages for all parties involved. Production techniques that are sustainable are more likely to strengthen and depend on the regional economy. Farms are

becoming more dependent on local resources, such as labor and native animals, rather than importing goods from outside their community, such pesticides and fertilizers.
Public Health: Animals raised on industrial farms are housed in cramped quarters, which raises the possibility of illness and potential pandemics. Antibiotics are frequently used on industrial farms to hasten animal growth and fend off illness. Antibiotic use is avoided by farms that follow sustainable agriculture practices. Nevertheless, farms that promote themselves as "sustainable" usually have little to no control, making it difficult to verify the usage of antibiotics.
Sustainable Agriculture and Farm Policy: The main source of farming policy is the Farm Bill, a multiyear bill that Congress passes around every five years. The Farm Bill, which was most recently passed in 2018 and is set to expire in 2023, offers assistance to both industrial and sustainable farmers. However, certain commodity crops grown at scale—most notably corn, soybeans, wheat, cotton, and rice—are given more funding than other agricultural sectors. The Farm Bill also establishes the Conservation Stewardship Program and the Environmental Quality Incentives Program, which offer financial and technical support to farms—including industrial farms— that use sustainable farming practices and soil, water, and air quality conservation. But the entire funding allotted to these initiatives is a very modest portion of the Farm Bill overall.

What Are the Current Greatest Threats to Agricultural Sustainability

By 2050, the world's food system will need to find a way to feed the nearly 10 billion people who will inhabit the planet. The food system has been able to produce more food over the last century or two thanks to industrialization, which has increased efficiency while also allowing farming to spread into forested areas and other untamed areas. If this pattern persists, it will contribute to climate pollution in ways that will render the planet uninhabitable for the most vulnerable populations. It has already resulted in large emissions of greenhouse gases, deforestation, and pollution. Among the various ways that agriculture affects society are by sustaining livelihoods through food, shelter, and employment; by providing the raw materials needed to make food and other products; and by fostering robust economies through trade.

The three advantages of sustainable development are as follows:

- It contributes to long-term economic growth;
- It lessens the impact on the environment by lowering pollution of the air, water, and soil.
- It ensures a better life for current and future generations.

Disadvantages of using modern farming methods are:

- The natural resource base has been abused by modern farming techniques.
- The fertility of the soil has decreased due to increased fertilizer use.
- Water depletion has resulted from the irrigation of tube wells using groundwater.
- Modern farming techniques cost a lot of money.