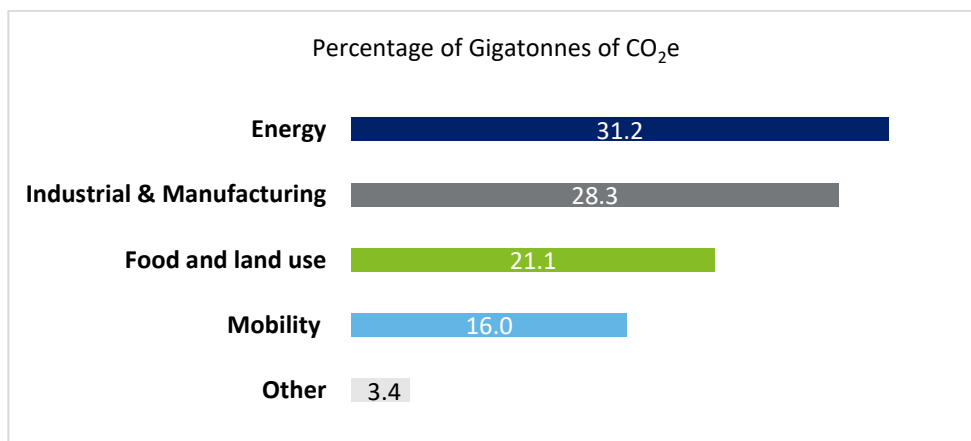




## Policy considerations for a low-carbon food and land-use system

### Introduction

Agriculture and land use change account for ~21% (~10 gigatonnes CO<sub>2</sub>e) of global GHG emissions,<sup>i</sup> largely from livestock farming, crop burning, and deforestation. Taking all factors into account, meat production generates the highest emissions per kilogram produced.<sup>ii</sup> Food spoilage also plays a significant role in generating emissions. An estimated 17% of total food production annually<sup>iii</sup>—931 million metric tons—is spoiled even though approximately 700 million people worldwide are chronically undernourished.<sup>iv</sup> This alone accounts for roughly 6% of total global GHG emissions.<sup>v</sup>



Unique to the agriculture and food system is the opportunity to go beyond net-zero, transforming from one of the largest sources of emissions to being net-negative. This includes:

- Re-prioritizing land-usage in urban and rural settings;
- Using anaerobic digesters, controlled irrigation, and technology-led agriculture on farms to mitigate GHGs such as methane; and
- Deploying regenerative agriculture practices such as no-till, use of cover crops, livestock rotation, and crop type diversification, although questions remain about the techniques' scalability and efficiency. <sup>vi</sup>

Achieving a low-carbon future necessitates that public and private sectors work together to facilitate the harmonization of complex, interconnected, emissions-free systems that break path dependencies and allow organizations to work together on climate solutions. Across all segments of the economy, government, businesses, and consumers, as well as finance and technology, will play key roles in the paradigm shift towards net-zero transformation.

Land and agriculture continue to be an economic driver for both developed and developing economies and a source of livelihood for vulnerable communities. The approach taken to achieve a low carbon food and land-use system requires that public and private sectors coordinate to ensure social protections are in place for those affected by changes in existing food and land-use systems.

## Policies and policy levers—five considerations to be addressed

Globally, policymakers are faced with a diverse collection of choices about how to move the agricultural and land-use system to a low-carbon footing while maintaining food supplies to feed a growing population.

### 1. Policies that can contribute to sustainable agricultural practices.

Livestock production accounts for approximately 6% of global GHGs while fertilizer use on agricultural soils accounts for approximately 4% <sup>vii</sup>. Deploying regenerative farming techniques, in addition to leveraging agricultural technologies, will be critical to advancing a low carbon agricultural system. Policymakers should consider how to promote sustainable agricultural practices while also taking into consideration varying economic effects. This may include policies geared toward the equitable distribution of resources, ensuring training for the agricultural workforce, as well as ensuring that technologies and interventions are fit for a local context.

### 2. Systemic and incremental shifts necessary to ensure that land use planning and activities lead to low carbon outcomes.

Land for crop and animal production account for 49% of global ice-free land surface <sup>viii</sup> and is the major source of GHG emissions in developing countries where agriculture is the main economic driver. Systemic changes, including agroforestry practices and improving the productivity of existing farmland, present opportunities to connect agricultural production to land-use planning. Businesses also have an opportunity to optimize land-use through technological enhancements. This can include controlled irrigation and precision agriculture, leading to producing more with less. Key enabling measures, such as collaborative efforts between government and business in increasing farm efficiency and reducing land clearing and deforestation, can reduce human impact on global land-use.

### 3. National governments can work with sub-national governments and local communities to address the challenge of sector prioritization in land-use planning.

Agriculture, housing, transportation, energy, and tourism all place significant demands on land. Land-use planning and governance present complex challenges as climate change impacts necessitate that limited surface area of land be used to address all sectors. The question of sector prioritization in land-use planning needs to be addressed at national, sub-national and local levels to develop strategies for sustainable development and long-term prosperity.

### 4. Governments can incentivize innovation and work with businesses on solutions that improve system efficiencies and encourage healthier lifestyles.

To support the balance of food production and mitigate environmental impacts, policymakers should consider reinforcing nutrition-based standards and promoting healthier and more sustainable diets. Incentives and investments in clean, unprocessed, and less carbon intensive dietary options are a major opportunity for economies around the world. It also

presents opportunities for companies of all sizes to focus on direct-to-consumer capabilities and offer food as a source of preventative health. Minimizing food spoilage across the agricultural supply chain also presents a significant opportunity.

As governments consider these solutions, they need to ensure greater accessibility and inclusivity of sustainable and healthy dietary options, specifically for low-income, developing, and vulnerable populations. Policymakers should continue to explore how to effectively incentivize digital solution implementation and business value creation across the food supply chain.

#### **5. Policies should minimize the social consequences of transition to a low-carbon food and land-use system.**

Policies governments choose to accelerate the transition to low carbon systems should consider the impact on jobs and economic growth. Farmers and workers in vulnerable communities will need support to develop the right skills and opportunities to meet sustainable agricultural practices and new employment trends in a low carbon system. Governments may have a difficult undertaking with re-skilling and re-educating all members of the food supply chain.

### **Find out more**

- Deloitte's [system of systems approach](#)
- Deloitte's [Climate Exchange](#)

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<sup>i</sup> Hannah Ritchie, "[Sector by sector: Where do global greenhouse gas emissions come from?](#)" September 18, 2020.

<sup>ii</sup> Hannah Ritchie, "[You want to reduce the carbon footprint of your food? Focus on what you eat, not whether your food is local.](#)" Our World in Data, January 24, 2020.

<sup>iii</sup> UN Environment Programme, "[UNEP Food Waste Index report 2021](#)", March 4, 2021.

<sup>iv</sup> Food and Agricultural Organization of the United Nations, "[Executive summary: Food security and nutrition around the world in 2020](#)," July 2020.

<sup>v</sup> Joseph Poore and Thomas Nemecek, "[Reducing food's environmental impacts through producers and consumers](#)," Science 360, no. 6392 (2018): pp. 987–92.

<sup>vi</sup> Janet Ranganathan et al., "[Regenerative agriculture: Good for soil health, but limited potential to mitigate climate change](#)," World Resources Institute, May 12, 2020.

<sup>vii</sup> Scott Corwin and Derek Pankratz, "[Leading in a low-carbon future: A 'systems of systems' approach to addressing climate change](#)", May 24, 2021

<sup>viii</sup> UN Intergovernmental Panel on Climate Change, "[Special Report on Climate Change and Land](#)", August 8, 2019

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