



# Agriculture and the Paris Agreement

By the CAP Energy Team | May 12, 2016

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## Climate change and U.S. agriculture

Today, the effects of climate change on domestic agriculture are felt through events such as droughts, wildfires, heavy downpours, and greater occurrences of pests.<sup>1</sup> Emissions of greenhouse gases from agricultural processes amount to 9 percent of all U.S. greenhouse gas emissions and have increased 11 percent since 1990.<sup>2</sup> Thus, as the United States moves forward with the rest of the world to respond to climate change, the agriculture sector will face the dual challenge of reducing emissions and enhancing resilience to climate change. This will require more sustainable agricultural practices—often referred to as climate-smart agriculture.<sup>3</sup>

This fact sheet describes how the recently established Paris climate agreement relates to the agriculture sector, along with the opportunities that climate-smart agriculture presents.

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## The Paris agreement

In December 2015, 196 governments reached an agreement in Paris to jointly address the threat of climate change.<sup>4</sup> Although the Paris agreement does not explicitly outline the role of agriculture in reducing global emissions, it does present opportunities for both mitigation and adaptation, and its preamble makes clear that the global community must address climate change's effects on agriculture to build resilience and enhance food security globally.<sup>5</sup> Specifically, the agreement commits to “holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C.”<sup>6</sup>

In order to achieve these goals, countries will have to go beyond their current emissions reduction commitments and develop additional plans for further action. As CGIAR, a worldwide partnership on agricultural research, has noted, “it will be impossible to stay within either a 1.5 or two degree C target if agriculture does not contribute to emissions reductions.”<sup>7</sup> Most countries recognize this necessity; more than 80 percent outlined mitigation strategies for agricultural emissions in their pledges under the agreement. Furthermore, agriculture is already a key focus point for countries' adaptation plans and commitments.<sup>8</sup>

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## Preparing for the effects of climate change

The 2014 National Climate Assessment concluded that unmitigated climate change will have varied and widespread effects on agriculture, including drought, cold snaps, increased pests, and extreme weather events.<sup>9</sup> Historic drought in California and the western United States caused \$4 billion in damage in 2014, and persistent drought conditions in Texas and the Great Plains states in 2012 and 2013 resulted in more than \$41 billion in damage.<sup>10</sup> A growing body of scientific research has found that, in part, climate change triggered both of these droughts, as well as that warming temperatures will increase both the likelihood and intensity of droughts.<sup>11</sup> Crop damage and loss not only have devastating effects on farmers' livelihoods but also can cause increased food prices and shortages. For this reason, adapting agriculture to the effects of climate change is essential to the ongoing success of this sector and the well-being of American families.

The agriculture sector is taking steps to prepare for these effects and develop more resilient crops. These strategies center on smarter and more sustainable use of resources, such as diversifying crop varieties and modifying tillage practices to improve the productivity of farming operations.<sup>12</sup> Broadly, the U.S. Department of Agriculture, or USDA, describes a framework of resistance, resilience, and transformation strategies in agricultural management.<sup>13</sup> This approach encourages farmers to develop resistance methods, such as crop selections, that are resistant to pest pressures brought on by climate change. In the longer term, the framework states that farmers will have to adopt resilience measures such as smarter irrigation practices, ultimately leading to the creation of an agricultural sector that can thrive despite increased pressures from climate change.

To that end, the USDA has outlined five climate-smart building blocks to encourage such measures.<sup>14</sup> These include voluntary and incentive-based technical assistance programs, tracking the success of such programs, and leveraging the efforts of the agriculture sector and conservation organizations to spur greater action.

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## Mitigating emissions

The Environmental Protection Agency, or EPA, outlines three strategies to reduce emissions from the agriculture sector: land and crop management, livestock management, and manure management.<sup>15</sup> Mitigating emissions through land and crop management requires more precise application of nitrogen-based synthetic fertilizers to reduce nitrous oxide emissions, which are nearly 300 times more potent than carbon dioxide emissions.<sup>16</sup> Livestock and manure management also reduces methane emissions—another potent greenhouse gas that is emitted through livestock digestion and manure decomposition. The EPA's methane mitigation strategies for livestock call for improved feeding practices as a means to reduce methane emissions during livestock digestion and for the control and capture of methane emissions during manure decomposition.<sup>17</sup> Soil

management is also an important component in mitigating the effects of farming emissions, as soil can sequester carbon dioxide when properly managed.<sup>18</sup> Currently, however, agricultural soil management contributes to more than half the emissions from the agriculture sector, including through the release of carbon previously stored in the soil.<sup>19</sup>

Additionally, nongovernmental organizations have called for more widespread and accurate recording of emissions from companies' agricultural operations. The Greenhouse Gas Protocol—a nonprofit initiative to motivate businesses to monitor greenhouse gas pollution—issues agricultural guidance for companies, detailing emissions inventory methods that more accurately assess the climate impact of farming and livestock.<sup>20</sup>

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## Conclusion

With the Paris agreement in place, global leaders have committed to tackling greenhouse gas emissions and mitigating the effects of climate change. Agriculture offers tremendous potential in the fight against climate change. Even as the United States and countries around the world work to unlock this potential, mitigation must be coupled with strategies to adapt agriculture to the stresses of climate change and make the agriculture sector itself more sustainable and resilient.

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## Endnotes

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- 6 Ibid.
- 7 Vanessa Meadu and others, "Paris Climate Agreement unlocks opportunities for food and farming," CGIAR, December 14, 2015, available at [https://ccafs.cgiar.org/research-highlight/paris-climate-agreement-unlocks-opportunities-food-and-farming#.Vx5TE\\_krldU](https://ccafs.cgiar.org/research-highlight/paris-climate-agreement-unlocks-opportunities-food-and-farming#.Vx5TE_krldU).
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- 12 C.L. Walthall and others, "Climate Change and U.S. Agriculture: An Assessment of Effects and Adaptation Responses" (Washington: U.S. Department of Agriculture, 2013) available at [http://www.usda.gov/oce/climate\\_change/effects\\_2012/CC\\_Ag\\_summary\\_online.pdf](http://www.usda.gov/oce/climate_change/effects_2012/CC_Ag_summary_online.pdf).
- 13 Ibid.
- 14 U.S. Department of Agriculture, "Agriculture and Forestry: Part of the Climate Solution," available at <http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=climate-smart.html> (last accessed May 2016).
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- 18 Environmental Protection Agency, "Land Use, Land-Use Change and Forestry Sector Emissions," available at <https://www3.epa.gov/climatechange/ghgemissions/sources/lulucf.html> (last accessed May 2016).
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