

Farms Under Threat 2040

CHOOSING AN ABUNDANT FUTURE



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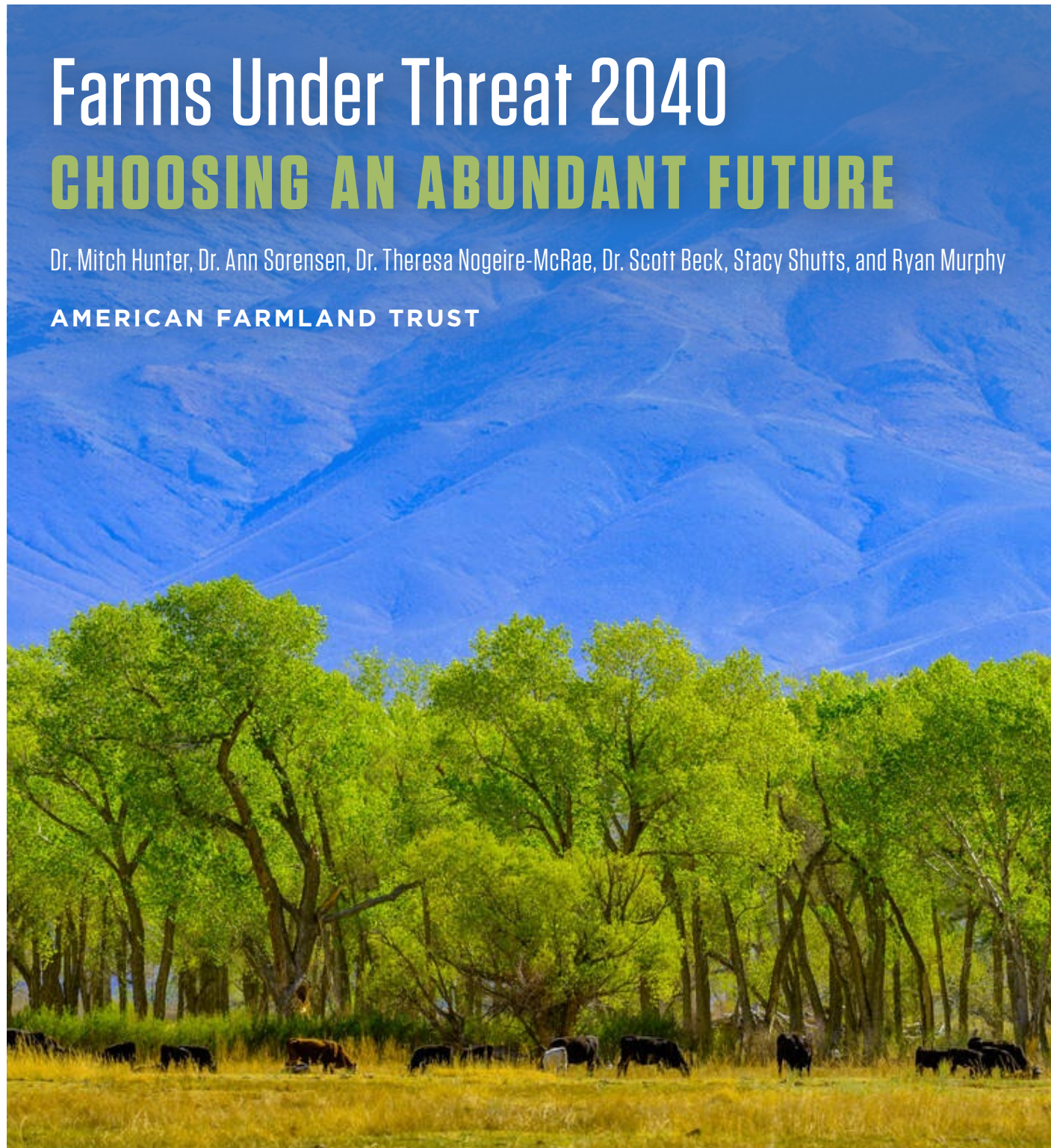
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AMERICAN FARMLAND TRUST





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Executive Summary

A **AMERICAN FARMS AND RANCHES** are a critical life-support system for our nation and the planet. In recent years, the global food system has been severely disrupted by the coronavirus pandemic, the war in Ukraine, and widespread drought—pushing millions more people into severe hunger. The mounting effects of climate change and the rising global population will make it ever harder to ensure a stable food supply in coming decades. It is urgent to safeguard the land that grows our food.

But farmland and ranchland do so much more than just feed us. With good stewardship, these lands can also sequester carbon in the soil, protect water quality, and provide habitat for diverse wildlife and native species.

Every acre counts. Yet, Americans are still paving over agricultural land at a rapid pace. From 2001–2016, our nation lost or compromised 2,000 acres of farmland and ranchland every day.

This report shows that, if this trend continues, another 18.4 million acres will be converted between 2016 and 2040—an area nearly the size of South Carolina. Of this total, 6.2 million acres will be converted to urban and highly developed land uses such as commercial buildings, industrial sites, and moderate-to-high-density residential development. The remainder, 12.2 million acres, will be converted to low-density residential areas, which range from large-lot subdivisions to rural areas with a proliferation of scattered houses.

While new development is necessary as the population grows, much of this conversion will be inefficient, using more land than necessary to comfortably house and support the population. This poorly planned development undermines global food security, local food systems, and the environment that we all depend on. It pushes up greenhouse gas emissions by lengthening commutes and reinforcing car dependence. Because the conversion is concentrated near cities and towns, it will have an outsized impact on smaller farms. It also places an undue burden on local government coffers, costing more for public services than it provides in taxes.

And rural sprawl could accelerate further in coming decades, driven by factors such as sky-high housing prices in metro areas and new opportunities for remote work. If this happens, 24.4 million acres of farmland and ranchland could be paved over, fragmented, or compromised by 2040.

But if policymakers and land-use planners across the country embrace more compact development, it would slash conversion and keep up to 13.5 million acres of irreplaceable farmland and ranchland from being turned into big-box stores, sprawling



The three future scenarios modeled in this report. For more details see **Visions of the Future: The Scenarios** (page 18).

subdivisions, and large-lot rural residences. That is an area larger than the states of Vermont and Maryland put together. These same policies could help retain nearly 7 million acres of our country's "Nationally Significant" farmland and ranchland, the most important land for long-term food security and environmental health.

Poorly planned development is far from the only threat to the future of farming. American agriculture now faces concurrent threats from climate change and energy production. On the current climate trajectory, average crop yields will decline and extreme events like droughts, floods, and heatwaves will wipe out the harvest with increasing frequency, undermining food security and farmer livelihoods. Just as sprawling subdivisions and large-lot rural housing eat up farmland, climate change is accelerating sea-level rise, inundating coastal farms. This report shows that, on our current climate trajectory, a total of nearly 450,000 acres of farmland will experience coastal flooding by 2040. Salinization of soil and groundwater will affect many more acres.

Meanwhile, the rising demand for energy means that tens of millions of additional acres of rural land will be used for energy production and transmission in the coming decades. To slow down climate change, policymakers must drive a transition to renewable energy that not only limits impacts on highly productive agricultural land, but also helps farmers improve viability and resilience.

Socioeconomic trends are exacerbating the threats to agricultural lands. Over 40% of the nation's farmland is owned by people over 65, so up to 370 million acres of farmland could change hands in the next 20 years, increasing the possibility that the land will be sold for development. And while many young people are interested in getting started in farming, the challenge of finding affordable land is keeping too many of them from starting successful farm businesses—especially folks from races, ethnicities, and genders that have historically been and remain marginalized in agriculture.

Proactive policymaking is needed to address climate change and energy while ensuring that a new, more diverse generation of farmers can take up the mantle as older farmers retire.

WITHOUT SMART GROWTH AND GOOD LAND-USE PLANNING, AMERICANS WILL PAVE OVER, FRAGMENT, OR COMPROMISE

18.4 million acres of farmland and ranchland.

THAT IS THE EQUIVALENT OF LOSING OR JEOPARDIZING:



115,000
FARMS



\$11 billion
IN FARM OUTPUT



263,000
JOBS

BASED ON COUNTY AVERAGES.¹



But it all starts with the land. This report focuses on the land itself, because we must secure our farmland and ranchland, or all other efforts to help farmers and ranchers thrive will be for naught.

We, as a society, have an important choice to make. Are we going to sit back and watch this critical resource disappear, eroding our food security, rural communities, and environment? Or will we join together now in a nationwide effort to secure an abundant future?

This report, and the accompanying [web mapping tool](#), are designed to help Americans explore these alternatives. Using advanced geospatial analysis, AFT and our partners mapped three

development scenarios from 2016 to 2040 (for more details see **Visions of the Future: The Scenarios**, page 18). The differences among them represent broad policy pathways that the country might take, rather than the results of specific, individual policies.

The results from the three scenarios show that Americans' development choices will have a profound effect on the future of agriculture:



If development follows recent trends, the U.S. will convert 18.4 million additional acres of agricultural land to more-developed uses between 2016 and 2040. Six states will convert over 10% of their agricultural land in this scenario, and more than 20 counties will convert over 40% percent of their remaining farmland. Perhaps most concerning, nearly half of the conversion will occur on the nation's most productive, versatile, and resilient farmland and rangeland, or Nationally Significant land. This means that Nationally Significant land is over 50% more likely to be converted by 2040 than other agricultural land.

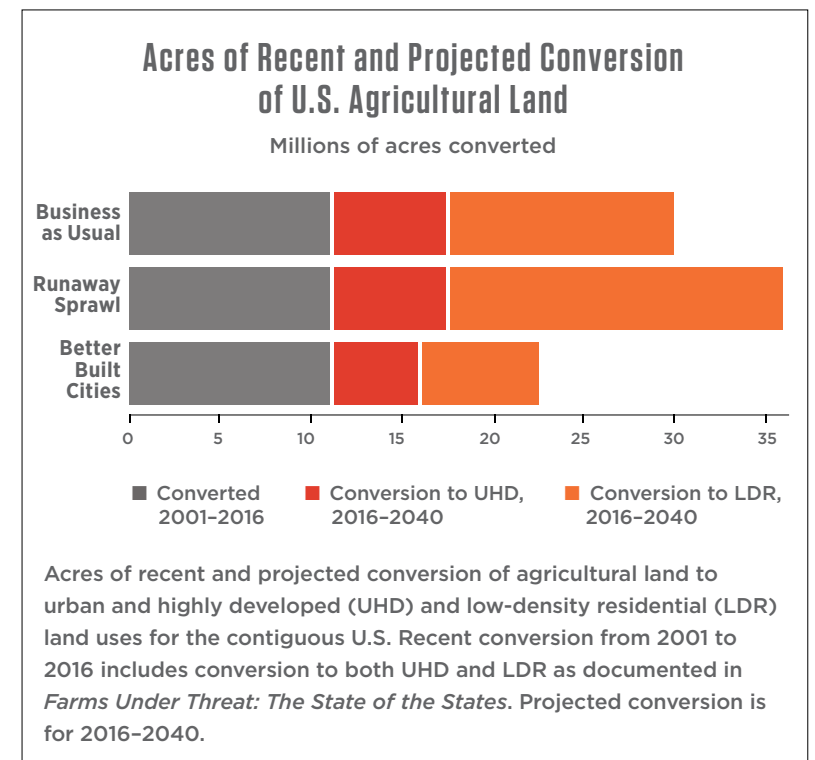


If even more Americans choose to live on large lots in rural areas, over 1 million acres of agricultural land will be lost or compromised every year, amounting to 24.4 million acres between 2016 and 2040. In this scenario, over 12 million acres of Nationally Significant land will be converted—a devastating blow to the nation's best land. Compared to *Business as Usual*, both Texas and North Carolina will convert more than a half million additional acres, while five states on the Eastern Seaboard will convert an additional 4–5% of their farmland. Connecticut and New Jersey,

for example, will see over 20% of their remaining farmland converted by 2040—in many cases, diversified farms that provide fresh produce, dairy, and meat to their local markets.



However, if policymakers and land-use planners focus on reducing sprawl by promoting compact development, agricultural land conversion could be cut by 7.5 million acres compared to *Business as Usual*—saving an area larger than the state of Maryland. At the same time, conversion of Nationally Significant land would decrease by 42%, taking the pressure off 3.7 million acres of our best land for growing healthy food. And a *Better Built Cities* future



would spare *over half* the farmland that would be converted in our *Runaway Sprawl* scenario—13.5 million acres. That is enough land to support over 82,000 urban-edge farms, produce \$7.9 billion in annual agricultural output, and provide 184,000 on-farm jobs. The vast majority of this land is located near cities and towns, providing the indispensable foundation for resilient, local food systems.

Which Future Will We Choose?

Without proactive policymaking and land-use planning, the relentless march of *Business as Usual* development across the American landscape will continue or accelerate into *Runaway Sprawl*.

The consequences will be local, global, and even atmospheric. Consumers will have fewer local farms to turn to the next time a pandemic or supply chain disruption leaves grocery store shelves bare. The global food supply will be further pinched, compounding crop losses due to climate change and putting millions more people at risk of severe hunger across the globe. And low-density sprawl will drive up greenhouse gas emissions, while undermining opportunities to sequester soil carbon on farms and ranches.

However, if policymakers and land-use planners band together with farmers, ranchers, and concerned citizens to choose *Better Built Cities*, it will save millions of acres of farmland and ranchland. This means following smart-growth principles and prioritizing agricultural land in land-use policies. It will also require supporting the farmers, ranchers, and farmworkers who bring in the bounty and keep pantries full, including by helping the next generation access land.

If Americans choose abundance—if we embrace smart growth and minimize sprawl, secure our most productive land in perpetuity, implement a smart transition to renewable energy, and usher in a new generation of farmers and ranchers—we will feel the benefits beyond our dinner tables.

Every American can help. Developers can choose to revitalize urban spaces and build compact communities. Citizens can

promote local land-use decisions that protect farmland and ranchland. Individuals can support local land trusts, buy locally produced food, and choose to live in compact neighborhoods. If you own farmland or ranchland, you can protect it with an easement so that your land becomes a legacy that feeds future generations.

But ultimately, achieving the goals of *Better Built Cities* will require rapid, widespread, and sustained efforts to improve policy and land-use planning at all levels of government. This will be a major undertaking, but Americans have come together in the past to forge a new approach to development and safeguard agricultural land. Innovative policies and approaches at the local, state, and federal levels have helped combat sprawl; supported farm viability and land access; and enabled the permanent protection of 6.9 million acres of agricultural land and counting.

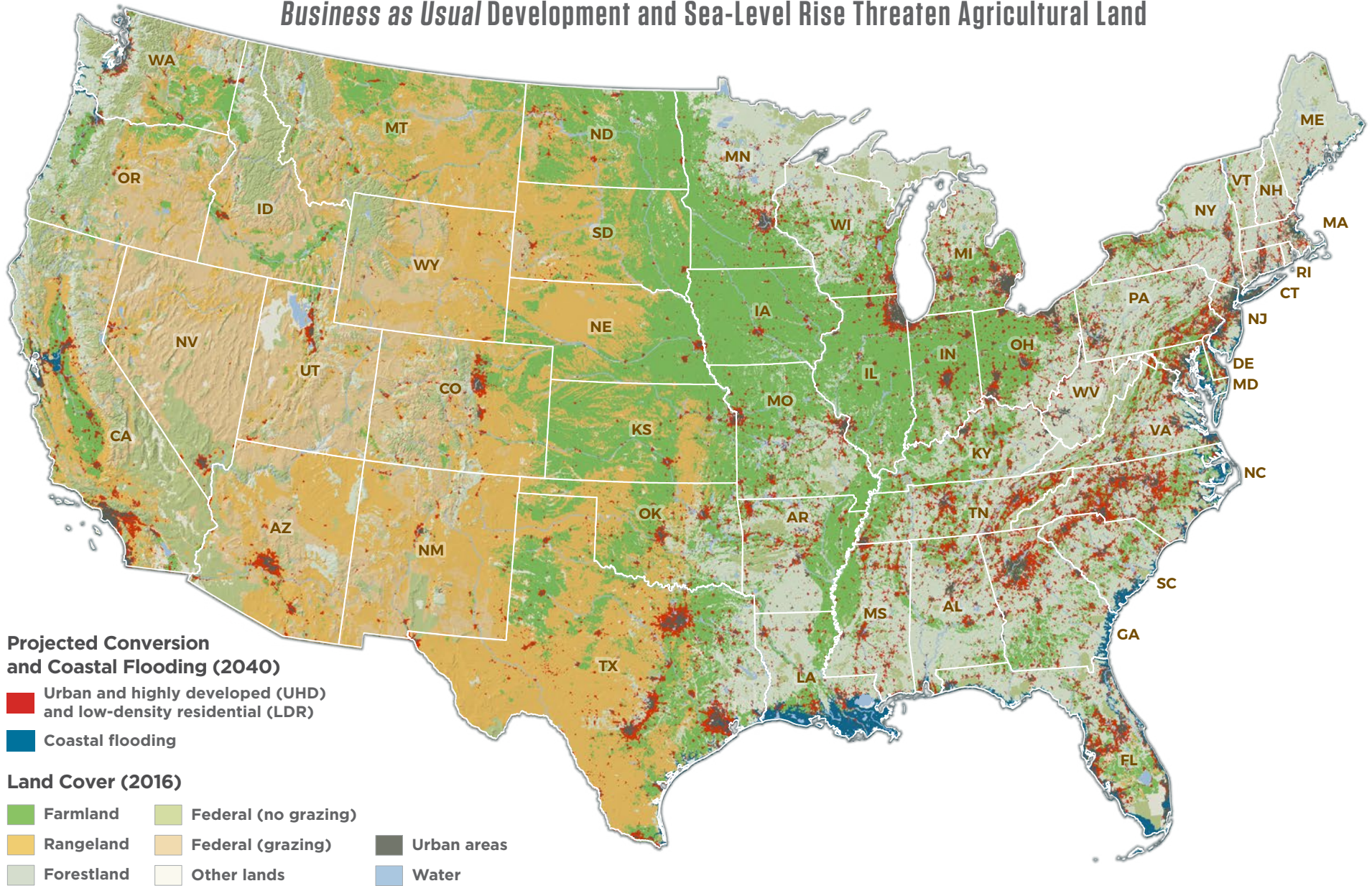
America must now build on these successes to counter the concurrent threats facing our irreplaceable agricultural resources. We offer the following policy recommendations to help our nation secure an abundant future:

1. Embrace smart-growth principles to improve land-use planning,
2. Permanently protect agricultural land to secure a supply of land in perpetuity,
3. Advance smart solar to boost both renewable energy and farm viability, and
4. Support farmland access to create opportunities for a new generation of farmers, particularly historically marginalized producers.

What Will Your Town Look Like in 2040?

AFT created an interactive web mapping tool (farmland.org/development2040) to help Americans understand the implications of their development choices. We invite you to explore these alternative futures and consider a few key questions: What do you want the landscape of your town, state, and country to look like in 2040? Do you want to see an abundance of healthy farmland and ranchland, or more big-box stores, warehouses and sprawling, large-lot housing? Which development choices would best reflect your values?

Business as Usual Development and Sea-Level Rise Threaten Agricultural Land



Projected conversion of non-federal farmland and rangeland to urban and highly developed (UHD) and low-density residential (LDR) land uses from 2016 to 2040 in the *Business as Usual* scenario, with the projected extent of coastal flooding due to sea-level rise in 2040. Farmland is composed of cropland, pastureland, and woodland associated with farms. Projections are illustrative of a possible future, not predictive. To explore this map in detail, visit farmland.org/development2040.

WHAT LOCAL GOVERNMENTS CAN DO

Smart Growth: Create comprehensive plans, embrace zoning approaches that encourage compact growth, and proactively plan for agriculture.

Farmland Protection: Identify agricultural resources and protect the agricultural land identified as a community priority.

Smart Solar: Incorporate smart solar siting into local land-use decisions; develop solar land-use laws and permitting through inclusive processes; ensure solar strengthens farm viability; and ensure best practices for soil health are followed when siting solar on farmland.

Farmland Access: Make municipal and county-owned lands available for agriculture and help match farm seekers with agricultural landowners.

WHAT STATES CAN DO

Smart Growth: Adopt smart-growth principles within state agencies, support local alignment with state smart-growth goals, and plan for agriculture across state agencies.

Farmland Protection: Identify priority agricultural resources, require mitigation for conversion, accelerate farmland protection efforts, incentivize keeping land in agricultural use, and enact the Uniform Partition of Heirs' Property Act to address heirs' property issues.

Smart Solar: Incentivize solar development on the built environment, previously disturbed, and marginal agricultural land; require mitigation for solar that displaces farming from productive agricultural land; and provide guidance and resources

to communities for smart solar, including best practices for construction and decommissioning. Fund research on dual-use solar (agrivoltaics) and, pending proof of concept, define and incentivize it.

Farmland Access: Invest in land access and farm transfer assistance to landowners and farm seekers, including FarmLink programs. Establish transition incentives, address farmland affordability through state farmland protection programs, and make state-owned land available for leasing to producers.

WHAT THE FEDERAL GOVERNMENT CAN DO

Smart Growth: Provide additional support for smart-growth planning and implementation grants, couple broadband funding with support for community planning, and encourage rehabilitation and conversion of commercial spaces.

Farmland Protection: Increase funding for USDA's Agricultural Conservation Easement Program (ACEP) and improve its function, strengthen the Farmland Protection Policy Act, and increase funding for the Heirs' Property Relending Program.

Smart Solar: Incentivize solar development on existing structures, brownfields, and marginal lands; fund research on best practices for developing solar on agricultural lands, including advancing dual-use; equip local, state, and regional leaders with smart solar resources; and expand interagency cooperation.

Farmland Access: Create tax incentives for lifetime farm transfers, improve Buy-Protect-Sell in ACEP-Agricultural Land Easements, provide additional support for business technical assistance that includes farm transfer, and allow producers to reduce Farm Service Agency debt in exchange for keeping land in agriculture.

Farmland and Energy: A Smart Solar Test Case



U.S. ENERGY CONSUMPTION is expected to increase in the coming decades as the population grows.¹³⁰ Poorly planned energy development can convert or compromise farmland. If the U.S. follows a path dominated by fossil fuel energy, there could be an additional 37 million acres of coal, oil, and gas development by 2040.⁴¹ However, to combat climate change—and minimize future challenges farmers and ranchers will face from droughts, floods, extreme heat, and beyond—America must transition quickly to renewable energy.

While the rapid expansion of solar and wind energy is just starting, it has the potential to reshape rural landscapes. Some see a conflict between growing food and producing renewable energy. But America needs *both*—clean energy *and* productive, resilient, and viable farms and ranches. Here, we examine “smart solar” on farmland as a test case for how we can achieve both goals.

Estimates of the amount of land needed for solar photovoltaics installations vary widely. Without further policy intervention, 2.9 million acres of utility-scale solar are expected to be built between 2020 and 2040 (*Mid-Case Scenario* in ref. [131]). However, the Biden administration has called for eliminating all fossil fuels from the electricity sector.¹³² Estimates of the amount of utility-scale solar needed to achieve this goal by 2040 range from 5.3 to 7.4 million acres (*E+ High Electrification Scenario* in ref. [133]; *Decarbonization with Electrification Scenario* in ref. [134]).

Additional low-carbon energy would also be needed from sources including wind turbines, hydroelectric dams, and nuclear power plants, further increasing land impacts. To fully electrify transportation, heating, and other energy needs, even more of all these energy sources would be needed.

According to a projection from the U.S. Department of Energy, solar energy will be widely distributed across the country (Figures 11 and 12). By 2040, four states could have over 500,000 acres of solar, and Texas could have over 1 million acres. Many Eastern states are projected to build enough solar to take up 1.5-6% of their farmland, forestland, and other undeveloped land, with the majority expected on farmland. These are statewide totals—the concentrations in communities with good siting and transmission opportunities will be substantially higher. For instance, proposed solar projects would cover 35% of the active farmland in one New York county, a total of 4,000 acres.¹³⁵

Without good planning and effective permitting processes, the impact of solar development on U.S. agricultural lands could be significant. In preliminary modeling of solar placement in the U.S., AFT projected that more than 80% of new solar built by 2040 will be sited on agricultural lands.¹³⁶ Likewise, a recent study in New York State found that farmland accounted for 84% of the land most suitable for utility-scale solar, even if prime and statewide important soils were avoided.¹³⁷

Solar developers favor the attributes of high-quality farmland since it is more likely to be flat, dry, cleared, and close to existing infrastructure.¹³⁸ AFT’s modeling found that if standard siting practices mirror historical patterns, 49% of new solar installations on agricultural land could go on Nationally Significant land, the nation’s best land for long-term production.¹³⁶

AFT works to advance “smart solar” approaches to enable the transition to renewable energy while protecting our nation’s farmland (farmland.org/solar). Smart solar minimizes impacts on agricultural land and makes any solar built on farmland more beneficial for farmers and for agriculture. AFT has developed the following smart solar principles:

- Maximize solar siting on disturbed, contaminated, and marginal lands and on rooftops.
- Minimize conversion of our best agricultural lands to conventional ground-mounted solar.
- Protect or enhance soil health for solar projects on agricultural land.
- Maximize agrivoltaics, otherwise known as dual-use solar, on lands well-suited for agriculture.
- Ensure that solar built on agricultural lands prioritizes farmer interests.
- Promote an equitable, ethical, and inclusive process for solar development.

Agricultural dual-use solar (agrivoltaics) shows substantial promise as an

alternative to conventional ground-mounted solar. In dual-use systems, agricultural production occurs under or around the solar installation itself.¹³¹ Sheep grazing is a common example, but novel systems are being developed for vegetable production, vineyards, and small grains. Encouraging research shows that shading from the panels can help conserve water and increase crop yields in some production systems, especially in hot, dry climates.¹³⁹

While AFT is working to expand dual-use, most new solar installations will be conventional for the foreseeable future. Therefore, it is critical to better understand the potential impact of solar energy development on farmland, agriculture, and rural communities. We need further research investigating the site-specific impacts of different scales of new solar development, including on soil health and farm viability. More research is also needed to define best practices for construction and decommissioning so all solar installations preserve the land's suitability for farming in the future, should panel removal occur.

Done right, renewable energy can provide reliable income streams for farmers while helping fight climate change. To help states and communities plan and develop policies to drive smart solar, AFT collaborated with Vermont Law School's Farm and Energy Initiative to compile a farmland solar policy design toolkit.¹⁴⁰ AFT's Farmland Information Center provides additional information on smart solar and dual-use opportunities at farmlandinfo.org/solar-siting.

Acres of Projected Solar Energy in 2040

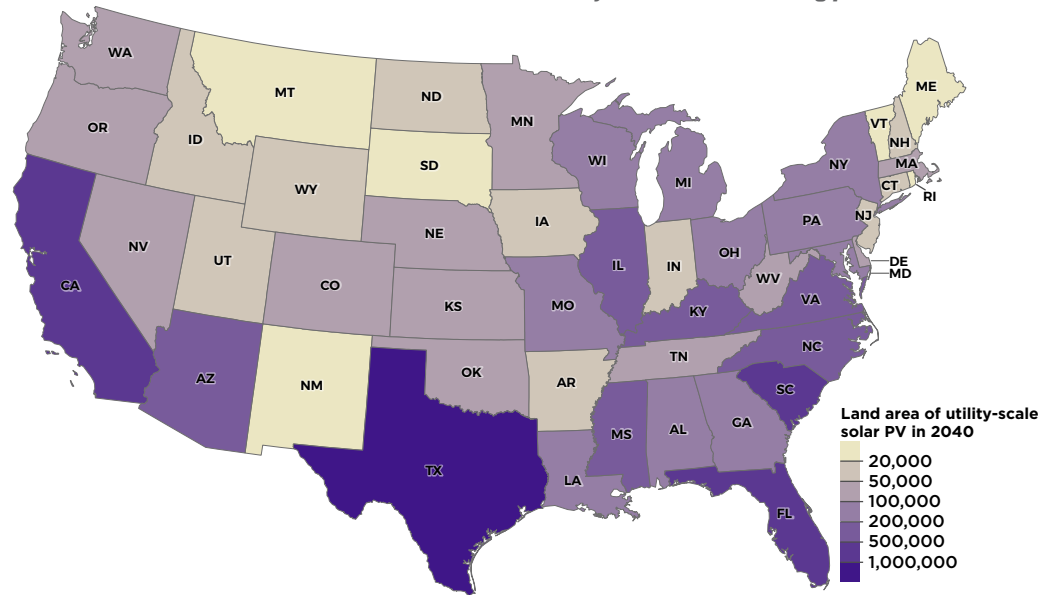


Figure 11. Projected acres of utility-scale solar photovoltaics (PV) energy generation facilities by state in 2040 in the *Decarbonization with Electrification* scenario of the Department of Energy's Solar Futures Study.¹³⁴

Percentage of Undeveloped Land Projected to Be Used for Solar Energy in 2040

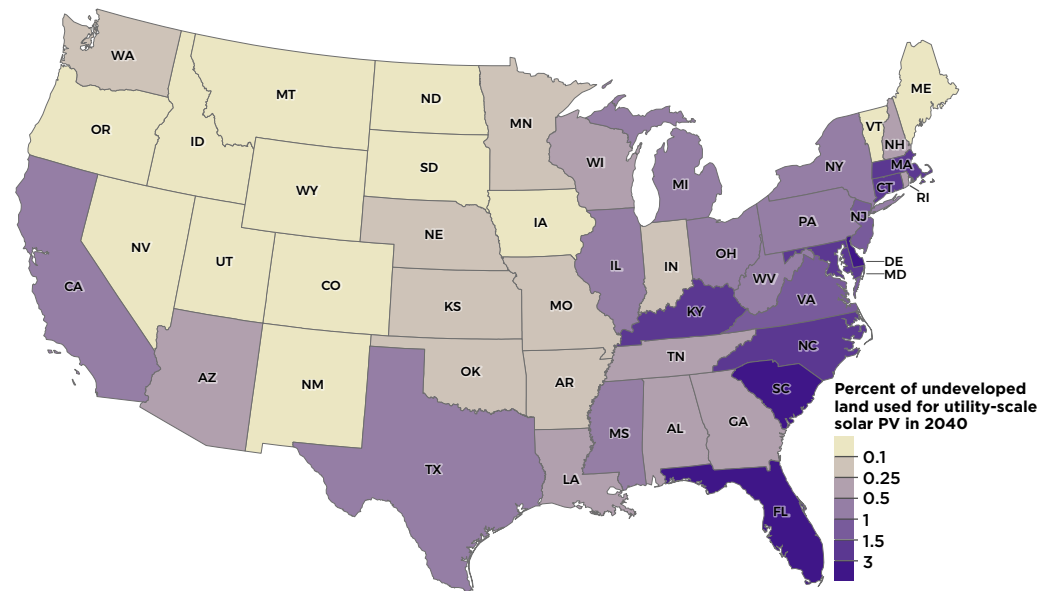


Figure 12. Projected percentage of undeveloped land remaining in 2016 that will be required for utility-scale solar photovoltaics (PV) energy generation facilities by state in 2040 in the *Decarbonization with Electrification* scenario of the Department of Energy's Solar Futures Study.¹³⁴ Undeveloped land includes all land area except the urban and highly developed, low-density residential, and transportation categories of the *Farms Under Threat* geospatial dataset.



FARMS UNDER THREAT

About American Farmland Trust

American Farmland Trust (AFT) works to save the land that sustains us by protecting farmland, promoting sound farming practices, and keeping farmers on the land. Founded in 1980, our research and advocacy have led to major advancements in both federal and state policy, ranging from enactment of the Farmland Protection Policy Act of 1981 to creation of multiple state-based farmland protection programs and a federal easement program that has invested more than \$2 billion to date in saving farmland.

For more information about AFT
visit us at farmland.org

For more information about our
findings and analyses, contact AFT's
Farmland Information Center staff at
(800) 370-4879, farmlandinfo.org

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American Farmland Trust
SAVING THE LAND THAT SUSTAINS US