



## LOSS OF PRODUCTIVE U.S. FARMLAND

There is a crisis in the offing that will affect long-term food security in this country, and in essence, the entire world. **Productive farmland in the U.S. that is now being used to supply the food and fiber to a growing world population is rapidly being covered by urban sprawl [the expansion of the geographic extent of cities and towns and associated amenities] and construction of facilities to generate renewable energy.** This happening is often attributed to the need to accommodate an increasing population, but it also results from a desire for increased living space by urban dwellers, plus the accompanying residential amenities that this relocated urban population expects in their new environs. Regrettably, this increased expansion of cities and towns and accompanying amenities into outlying areas is not accompanied by the reversion of abandoned metropolitan areas to agricultural production. Therefore, this sprawl that often covers productive farmland in the areas that surround metropolitan areas, as well as outlying areas, results in a net loss of land to agriculture that is equal to the amount of land that it covers. This land is essentially lost to agriculture forever—i.e., it likely cannot or will never be used to produce crops again.

The [American Farmland Trust \(AFT\)](#) published a report titled “[Farmland Under Threat 2040: Choosing an Abundant Future](#)” that addresses the need to curtail the conversion of American farmland to non-agricultural uses such as urban sprawl and renewable energy production. A summary of the major points from that report follow.

- It is urgent to safeguard the land that grows our food so that a stable food supply is assured in the coming decades.
- From 2001-2016, the U.S. lost or compromised 2,000 acres of farmland and rangeland every day. If this trend continues, another 18.4 million acres will be lost to farming between 2016 and 2040. This lost farming acreage will be converted to highly-developed urban uses, low-density residential areas such as large-lot subdivisions and rural areas with scattered houses, and renewable energy facilities such as wind and solar.
- It is predicted that nearly half of the conversion of U.S. farmland at current rates will be that involving Nationally Significant Land, or the nation’s most productive and versatile farmland and rangeland.
- If policymakers and land-use planners adopt more compact development approaches, much of this irreplaceable farmland will be spared from conversion to non-farm uses.
- The projected loss of productive farmland is especially egregious when considered along with the potential for

declining yields brought about by climate change, the use of land for energy production, and the largely impossible conversion of urban lands back to productive farmland.

- Since over 40% of farmland is owned by people over 65, much of present-day farmland will likely change hands in the next 20 years. This will increase the possibility of farmland being sold for development. Plus, the challenge of finding affordable land for farming is keeping many young people from getting started in farming.
- The report lists three avenues of approach for the coming decades. They are: 1) **Business as Usual**, which will result in the potential loss of the 18.4 million acres of farmland as stated above; 2) **Runaway Sprawl**, which could lead to 24.4 million acres of lost farmland by 2040 resulting from inefficient and poorly-planned development; and 3) **Better Built Cities**, which embraces more compact urban development to reduce the loss of productive farmland to development.
- Results from the three approaches will have a profound and lasting effect on the future of agriculture and food production in the U.S. because land that is lost to agriculture is essentially lost to that enterprise forever.
- Finally, without proactive policymaking and land-use planning, the current and relentless march of the **Business as Usual** approach will continue or accelerate into **Runaway Sprawl**. Both will severely curtail food production potential in the U.S.
- Agricultural land that is currently used for food production must be permanently protected to ensure a perpetual supply of food to a growing U.S. and world population. This will involve both **Smart Growth** and **Farmland Protection** approaches at all levels of government.
- Ignoring this impending threat will result in irreversible consequences that will curtail this country’s food production capability, and this will affect both the U.S. and world populations.

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The concern about the use of dwindling and unreliable fossil fuel energy sources, plus their perceived contribution to “global warming/climate change”, has caused power suppliers to look to alternative sources [especially renewable energy sources] to provide the energy that will be needed to partially replace that now supplied by fossil fuels.

One of the sources that appears to offer an alternative is solar power. Productive farmland that is currently used for agricultural production generally has the terrain, exposure, and soil texture that provide the easiest and cheapest sites for



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solar panel arrays. However, land covered by solar panels poses a new threat to productive U.S. farmland as detailed in the below linked articles and accompanying narrative.

An article titled "[Prime farmland loss to large-scale solar: A Maryland case study](#)" by Elizabeth Thilmany covers this subject in the state of Maryland. Pertinent points in this article follow. 1) Only one of the currently built utility-scale solar projects in the state is not on "prime farmland", or "farmland of statewide importance". More specifically, 44% of utility-scale acres that have been developed in the state are on "prime farmland", 48% on "farmland of statewide importance", and only 8% on "not prime farmland". 2) The most likely gross revenue per acre increase for a farmer who transitions land from farmland to solar power generation would be about 350%. 3) A continuing increase in renewable energy generation such as from large-scale solar systems will result in the loss of productive farmland in the U.S. 4) The impacts from this shift in farmland loss to energy production should be determined sooner rather than later.

An article titled "[Approaches to Balancing Solar Expansion and Farmland Preservation: A comparison across Selected States](#)" by Grout and Ifft at Cornell Univ. (May 2018) provides an overview of how solar energy production has affected farmland in selected states, along with some of the policies adopted by those states to address the conversion and subsequent loss of productive farmland to solar power production sites. Pertinent points from the article follow.

- The mandating by some states that some significant percentage of its electricity must be generated from a renewable source such as solar power has led to an upsurge in securing land for solar power facilities.
- Many of the land characteristics desired by developers of solar facilities are associated with land presently used for farming.
- The potential higher income per acre from solar facilities will be significant for those landowners who choose this option since the increased income resulting from conversion of farmland to a solar energy site may act as a hedge against erratic commodity prices and unpredictable production.
- Farmers who rely on rented land for their agricultural enterprises likely will see higher rental rates and lower land availability for rent if development of solar facilities becomes commonplace.
- Finally, the authors have summarized the solar siting policies of several states that have experienced a high level of utility-scale solar power development on agricultural land as of 2017. The policies examined include tax treatment of farmland, incentives for

farmland preservation, solar site permitting, renewable energy policies, and brownfield [e.g., landfills, contaminated land, unused commercial or industrial sites, land that has few if any alternative productive uses] development programs.

- [Caveat: It is likely that the figures for conversion of agricultural land to solar facilities cited in this report have changed significantly since 2018. It is also likely that this conversion has increased to result in the loss of even more productive agricultural land in this country.]

An article titled "[Considerations for Transferring Agricultural Land to Solar Panel Energy Production](#)" by Mike Carroll of the North Carolina Coop. Ext. Service discusses an extensive list of topics that should be considered by landowners when transferring agricultural land to a solar farm. After consideration of the issues outlined in the report's listed topics, each individual landowner will need to decide if the transition of farmland to a solar panel site is feasible. After all, higher revenue on a per acre basis from a solar panel site does not necessarily translate to greater profit since higher expenses may also be incurred at these sites. Also, many solar farm projects may be based on financial tax incentives that will ultimately cost society and government entities. And finally, loss of productive agricultural land to solar sites is detrimental to the long-term ability of the U.S. farm community to produce the greater amount of food that will be expected of them.

An article titled "[Solar factors into loss of prime farmland](#)" by Tom Bechman [Delta Farm Press. Aug. 2022] provides a commentary about how Indiana farmers perceive that the rush toward alternative energy sources such as that provided by wind or solar farms is taking prime farmland out of agricultural production. The following points from this article are highlighted here. 1) Solar farms cover more farmland than wind turbines. 2) The concept of raising livestock or growing crops in conjunction with solar farms is still just a concept. 3) Landowners often opt to take the lucrative rent provided by solar energy companies instead of raising crops on the affected land. 4) Land owned by absentee landlords and that is converted to solar farms means fewer crop acres for rent. 5) The term "solar farm" is a misnomer since in effect solar installations remove land from true farming. 6) Solar installations of any size tend to take the best land, not the worst.

An article titled "[Total loss of farmland staggering](#)" appears in The Delmarva Farmer. Major points from that article are: 1) Using land for the production of wind and solar energy is a contributor to the loss of U.S. farmland; and 2) There must be increased support for programs that preserve farmland for



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agricultural use and that will benefit farmers who produce the food on that land.

“[Farmer’s Guide to Going Solar](#)” published by the U.S. Dept. of Energy provides a list of questions that farmers should consider and answer before deciding if a “solar farm” is the right choice for them. One question that is not posed in this guide is “How will this conversion of vast amounts of U.S. farmland affect the food supply in this country?”. This is a question that should be addressed by those who make the laws that are needed to preserve prime agricultural land so that it is available to produce the food that will be needed to feed an increasingly urban population.

An article titled “[Maine’s prime farmland is being lost to solar. Is ‘dual use’ the answer?](#)” by Kate Cough covers this subject in the state of Maine. Pertinent points in this article follow. [Many of the points in this article apply to solar energy projects wherever they may be located.]

- Maine has only a small amount of land that is suitable for agriculture, or land that is considered “prime”, or “soils of statewide importance” for the production of human food and fiber. However, a significant portion of this land is being converted to sites for solar energy production.
- Once an agricultural site has been converted to a solar energy farm with solar panels, it is highly unlikely that it will be farmland again.
- One of the reasons for rapid solar development in Maine is that state lawmakers have not enacted rules about where solar energy farms can be located. Presently, the vast majority of these new facilities have been or soon will be constructed on “prime” sites which provide the cheapest, easiest options for installing solar panels that will generate power from solar energy.
- Solar power generation can provide an economic cushion for farmers since the income from such sites can offset the small and unpredictable profit margins that are the norm from traditional agricultural enterprises.
- As Maine farmers lose prime farmland to solar energy developments, “dual-use” has emerged as a way to keep such land in limited agricultural production. The Maine government encourages farmers that are considering solar panel installations on actively farmed land to prioritize this dual-use approach.
- This dual-use approach is okay if applied to the grazing of low-statured livestock such as sheep, but will require a more expensive installation process if dual-use is to include cattle grazing or crop farming. This is not attractive to solar energy developers, and offers less income potential for the landowner.

An in-depth article titled “[Emerging Agrivoltaic Regulatory Systems: A Review of Solar Grazing](#)” by Guarino and Swanson presents a detailed discussion of how land used for solar energy production can also be used for certain agricultural enterprises. Pertinent points from the article follow.

- The loss of productive farmland to the exponential growth of solar power production facilities is often counter to farmland policies that are designed to protect productive farmland. This rapid growth in solar energy production facilities requires that guidance and regulations must be forthcoming to ensure that compatibility between these facilities and agricultural enterprises is assured.
- The rapid development of utility-scale solar energy production facilities has resulted in tensions in rural communities over the proper use of rural land, especially that used for agricultural enterprises. This has led to a process called “**agrivoltaics**”, or the co-location of solar panels and agricultural enterprises on the same site.
- Agrivoltaics is a dual land-use approach that allows a particular tract of land to be used simultaneously to generate solar power from solar panels along with an agricultural enterprise such as livestock production.
- Current zoning laws are used to mitigate land-use conflicts by creating distinct zones for incompatible land uses. However, the authors present evidence that land used for solar energy production can be synergistic with agriculture. They contend that zoning and taxation laws, and contractual arrangements, are critical to the overall viability of agrivoltaic operations.
- Solar grazing, or the use of solar energy production sites for livestock grazing, is prevalent and shows how agrivoltaics can be accomplished. **However, research to assess the compatibility of crop production at these sites is needed.**
- This article contains the following parts. 1) **Background of Shifting Agricultural Land Use in the U.S.** and the increasing development of co-located renewable energy production facilities and agricultural production. 2) **Zoning and Taxing of Agrivoltaics** deals with the current state of these policies, as well as ways to improve zoning ordinances and taxation provisions to enhance the growth of agrivoltaics. 3) **Solar Grazing and Emerging Regulatory Systems** examines this emerging field plus the lack of regulatory structure that hinders its development. 4) **An examination of Template Solar Grazing Contracts** provides an overview of contract allocations of risk and responsibilities between solar site managers and livestock producers who are partnering in agrivoltaics. 5) **Policy Examples for Solar Grazing** looks at instances of livestock management on solar



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energy production sites that might require specific contractual arrangements between solar site managers and livestock producers.

- Finally, there is a need for legislative action to 1) make zoning laws compatible with agrivoltaics to prevent the fear of fines or legal action against a landowner, and 2) make taxation laws compatible with a change in land use resulting from agrivoltaics so that a drastic change in taxes is not imposed on a landowner. Also, farmers who desire to practice agrivoltaics must also be protected against the liability of risk they are incurring by practicing an agricultural enterprise near valuable solar panels.

A DeltaFarmPress article dated Nov. 1, 2024 and titled “[Can Agrivoltaics help solar energy and agriculture coexist](#)” by Forrest Laws presents information provided by speakers at the National Agricultural Law Center webinar on “[Can Agriculture and Solar Coexist? Exploring the Promise and Challenge of Agrivoltaics](#)”. Key points contained in that article about trends in the solar energy sector follow.

- Tax incentives are helping grow solar energy production.
- Development of solar energy production capacity is a critical component in efforts to curb climate change and decarbonization.
- Solar energy project developers prefer to use agricultural lands because they are well suited to development of such projects.
- Research is needed to validate the growing of shade-tolerant crops under or around a solar panel array.
- A solar panel array must be constructed to manage a particular livestock enterprise that is planned to co-exist with the array. There are data that show that sheep may be the best livestock option to co-exist with the array.
- There must be available markets for the products from any enterprise that co-exists with the solar panel array.
- It is perceived that the inclusion of agrivoltaics with a solar project could decrease potential opposition to the project.
- Dual use of property devoted to a solar energy project could result in reduced property taxation.

The above-cited articles about solar energy projects are just a few that have been written about this subject. Note that there is little information in any of the above articles that paint a positive picture for the dual use of solar panel sites and crop production. Thus, it appears that productive agricultural land that is lost to solar energy production will have the same negative effect on food production as will the loss of land to “urban sprawl”.

The growing development of solar energy production

facilities may not appear to impact Midsouth agriculture in general and soybean production specifically at the present time. However, the open and level terrain of land in the Midsouth likely will soon be eyed by solar energy producers as land that is highly suitable for easy and cheap installation of solar panel farms. This may be economically attractive to both solar energy producers and landowners in the short term, but will add to the overall problem of less land that will be available for food production in this country. This falls under the age-old adage of “you can’t have your cake and eat it too”; i.e., will consumers’ desire for more energy in the short term override the ability of this country to produce the food that will be needed by an increasingly urban population in the long term? Lawmakers must act now to ensure that productive U.S. farmland continues to be available in an amount needed to produce the food and fiber that will be needed to meet future needs.

With all of the concern about sustainability in this country, it is incumbent on the powers-that-be at the local, state, and federal levels to realize that the ability for U.S. farmers to produce a continuing supply of plentiful food depends on maintaining a suitable supply of quality farmland to support the raising of that food.

We in this country are accustomed to a plentiful supply of food. The quest for renewable and clean energy can adversely affect that supply since the facilities needed to produce that energy will cover productive farmland.

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