American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

AgriSolar Consulting

Addressing Barriers to Producer Adoption of Agrivoltaics

RECOMMENDATIONS FOR THE STATE OF COLORADO

American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

American Farmland Trust (AFT) is the largest national organization dedicated to protecting farmland, promoting sound farming practices, and keeping farmers on the land. AFT unites farmers and environmentalists in developing practical solutions that protect farmland and the environment. We work from "kitchen tables to Congress," tailoring solutions that are effective for farmers and communities and can be magnified to have greater impact. Since our founding, AFT has helped to protect more than seven million acres of farmland and led the way for the adoption of conservation practices on millions more. AFT has a national office in Washington, D.C., and a network of offices across America where farmland is under threat.

For more information, visit us at **farmland.org**

AgriSolar Consulting

AgriSolar Consulting was founded to advance sustainable land use, farm viability, and renewable energy through agrivoltaic solutions. Recognizing that global food and energy security require innovative local solutions, AgriSolar Consulting works at the nexus of agriculture and energy to promote synergies that enhance community resilience. To realize practical, integrated climate solutions and progress innovative policies and practices for agrivoltaics in the U.S., AgriSolar Consulting leverages expert experience in social science, energy policy, solar development, horticulture, land use, and 3D modeling. This small, woman-owned, Michigan-based consulting company is devoted to ensuring that the future of renewable energy is shaped by, and benefits, America's agricultural communities.

For more information, visit us at **agrisolarconsulting.com**

WALTON FAMILY FOUNDATION

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COVER: Cattle grazing under solar panels at Jack's Solar Garden in Longmont, Colorado.
PHOTO BY JOE DELNERO/NREL

Based on modeling from American Farmland Trust (AFT), Colorado could experience significant additional conversion of the state's most productive agricultural lands by 2040—up to 417,500 acres, equivalent to 1,900 farms, could be lost under a business-as-usual scenario with 53% occurring on Colorado's best farmland.[1] Funding and policy support for Smart Solar,℠ including advancement of agrivoltaics as a tool to enhance agricultural viability and economic resilience for farmers, represents an important priority for Colorado and other states that are on course for accelerated deployment of solar energy generation projects in the coming years.

BRYAN BECHTOLD/NREL

Agrivoltaics holds promise for Colorado's agricultural sector, especially in terms of economic diversification and resilience to climate change. Widespread adoption will require concerted efforts in research, policy, and technical assistance. The Colorado Agrivoltaics Survey, conducted by AFT in partnership with AgriSolar Consulting, Colorado State University, Colorado Open Lands, and Colorado Department of Agriculture's (CDA) Agrivoltaics Research and Demonstration program, aimed to increase understanding about Colorado agricultural stakeholder's perceptions, interests, and concerns with agrivoltaics (co-locating solar panels with agriculture). The survey was distributed to 6,000 agricultural producers across the state in spring of 2024. Insights gathered from approximately 300 diverse respondents provide a novel description of the state-of-knowledge of agrivoltaics among Colorado producers and identifies key barriers and needs related to implementation. Generally, the findings highlighted common environmental concerns among producers accompanied by interests in economic benefits and dual land use.

Informed by AFT's farmer engagement efforts, we recommend a suite of educational resources, technical assistance opportunities, policy tools, and research priorities designed to address producers' concerns and interests in agrivoltaics identified by the Colorado Agrivoltaics Survey. Recommendations are presented in tandem with key survey findings to ensure next steps are stakeholder-driven and to underscore how the Colorado Agrivoltaics Survey is foundational for informing action items for the Colorado agrivoltaics community. These recommendations are intended to help mature the agrivoltaics market in Colorado in a way that reflects agricultural stakeholder interests and concerns.

1 Hunter, M., A. Sorensen, T. Nogeire-McRae, S. Beck,S. Shutts, R. Murphy. 2022. Farms Under Threat 2040: Choosing an Abundant Future. Washington, D.C. https://farmland.org/project/farms-under-threat.

Educational Resources and Technical Assistance

OPPORTUNITY IDENTIFIED There is opportunity to expand Colorado producer awareness of agrivoltaics and support their decision to adopt the practice. 48%–65% of survey respondents are willing to engage with most agrivoltaic activities, yet nearly 70% of respondents have basic or no understanding of the concept. Respondents indicated they prefer learning through field demonstrations, peer-to-peer learning, and also find conference sessions and facts sheets to be effective means of information distribution.

Recommendations

- Launch webinar series that addresses key knowledge gaps identified by survey respondents, specifically financial, legal, and land lease considerations.
- Develop Agrivoltaics Farming Guides and other fact sheets that feature best management practices learned from the Colorado Agrivoltaics Learning Center and other projects in comparable climatic regions.
- Deliver workshops, demonstrations, and training courses to improve producer knowledge and capabilities in agrivoltaics.
- Host farm-to-table events at Denver Botanical Gardens agrivoltaics site and the Colorado Agrivoltaics Learning Center to increase awareness and of agrivoltaics.

OPPORTUNITY IDENTIFIED CSU Extension can play a key role in facilitating the appropriate deployment of agrivoltaics in Colorado. In the farmer survey, respondents indicated they trusted CSU Extension (39%) above other sources for information about agrivoltaics, followed by farm associations and state agencies. Respondents also expressed interest in technical assistance programs to better understand economic and technical opportunities for agrivoltaics.

Recommendations

- Dedicate state funding to enable CSU Extension to act as service providers in agrivoltaics.
- Establish a dedicated technical assistance team, staffed by both CSU Extension and CDA, to provide site assessments, project planning, and feasibility studies to producers interested in agrivoltaics.
- Expand AERO grant writing technical assistance to support applicants seeking property tax exemption through SB23-092.

CONCERN IDENTIFIED Financial and legal uncertainties challenge producer adoption of agrivoltaics. More than 50% of survey respondents indicated that information about financial costs and benefits, as well as legal advice related to lease agreements and ownership, are the most important when making decisions about leasing land for solar development. Survey respondents noted concerns about the reliability of solar developers and how legal contracts might address long-term maintenance, liabilities, and land restoration.

Recommendations

- Develop Solar Leasing Guide specific to Colorado, building on previous work lead by AFT (PNW Solar Leasing Guide).
- Expand AERO technical assistance to include direct services related to navigating land leases and cost-benefit analysis for producers.
- Promote producer engagement with the DOE C2C Expert Match program administered by NREL.

Policy Tools

OPPORTUNITY IDENTIFIED Agrivoltaics may be more financially accessible to producers through market mechanisms. Tax incentives, grants, and low-interest loans were highlighted by survey respondents as potential tools to reduce costs and therefore enable adoption. Survey results indicate that producers would be motivated to lease land for solar, or to try agrivoltaics, if it provided supplementary farm income.

Recommendations

- Strengthen provisions for agrivoltaics as stipulated in SB23-092 (Agricultural Producers Use Of Agrivoltaics), specifically:
  - Extend SB23-092 property tax exemption throughout life of an agrivoltaics project; enable qualified agrivoltaics projects to be assessed as agricultural for purposes of property taxes.
- Develop explicit provisions within ACRE3 that set agrivoltaics system criteria and allow producers to pursue system cost share for qualifying agrivoltaics projects.

OPPORTUNITY IDENTIFIED Survey respondents indicate preferred lands for solar siting, which helps inform solar development strategy and land use policy. There was strong support for placing solar panels on underutilized or marginal lands rather than on highly productive agricultural areas.

Recommendation

- Encourage the state to mandate utility bid preference programs that reward projects that are actively sited on underutilized or marginal lands, or that awards projects that meet agrivoltaics criteria.

CONCERN IDENTIFIED Producers are worried about the effects of solar projects on agricultural land in Colorado. Survey respondents noted impacts on land conservation, farm productivity, and soil quality among their highest concerns with solar development.

Recommendations

- Include provisions within community agreements for returning land back to a state with equal or improved agricultural viability at end of project life.
- Include construction performance standards and land stewardship metrics as part of evaluation criteria in solar RFPs to minimize site disturbance.

WERNER SLOCUM/NREL

Research Opportunities

OPPORTUNITY IDENTIFIED Producers are most interested in learning more about agrivoltaics and solar integration opportunities to continue farming through peer-to-peer learning, and field demonstrations. There is also significant interest in information about financial costs, benefits, and opportunities for their operations.

Recommendations

- Extend CDA SB23-092 to offer a Phase 3 funding for continued research dedicated to understanding agricultural productivity and ecological sustainability of agrivoltaics in the state. Extend the funding cycle to better align funded projects with the growing season to more effectively support or field-based crop trials and related research.
- Facilitate more state-level surveys and targeted engagement activities to identify concerns and interests across stakeholder groups, including community members and solar developers. Leverage findings to inform ongoing research priorities for Colorado.

CONCERN IDENTIFIED There are concerns about solar among producers related to land degradation, long-term financial viability, and ecological impacts. Producers noted concern about the challenges associated with restoring land after the life cycle of solar projects.

Recommendations

- Institute longitudinal research on land restoration methods, successes, and opportunities for improvement.
- Conduct field-based research on agronomic and economic impacts of agrivoltaics, with comparative analyses across Colorado's growing regions.
- Focus field research efforts on areas where natural synergies exist between climate and configuration—for example, where climate may impact high value crops that are already grown in tandem with infrastructural costs.

WERNER SLOCUM/NREL

RESOURCES

Check out **farmland.org/solar** or contact:

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