Assessing Financial Feasibility of Agrivoltaics in New Hampshire

Dynamic Incentive Fund Modeling and Stakeholder Perspectives

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Abstract

Agrivoltaics is an emerging technology that mitigates land-use competition between agriculture and energy generation by enabling the co-location of solar photovoltaics and cultivation (Coluccia et al., 2025; Jamil & Pearce, 2026). This approach offers a plethora of benefits, including improved water efficiency, crop shading that reduces heat stress, potential yield impacts, increased solar generation, and enhanced farm revenues (Asa'a et al., 2024). As such, agrivoltaics represents a promising pathway for advancing several United Nations Sustainable Development Goals related to food security, clean energy, climate resilience, and sustainable land management.

In New Hampshire, declining renewable energy costs and supportive policies are elevating the role of solar photovoltaics in the state's electricity system. Although solar currently supplies a modest share of total generation, it is increasingly viewed as a strategy to address high electricity prices (Wake, n.d.). Within this context, this poster synthesizes stakeholder-identified weaknesses in the state's energy–agriculture interface, presents a preliminary dynamic model assessing the financial sustainability of incentive funding, and connects agrivoltaics benefits to the United Nations Sustainable Development Goals.

Hypothesis

An agrivoltaics farm would be more profitable than a conventional farm under specific conditions in New Hampshire.

Data Collection

Method: One-to-one semi-structured interviews guided by structured questionnaires

Participants include agricultural and energy committee members, solar developers, loan lenders and financing institutions

Focus: Key insights, perceived barriers,and emerging opportunities for agrivoltaics adoption

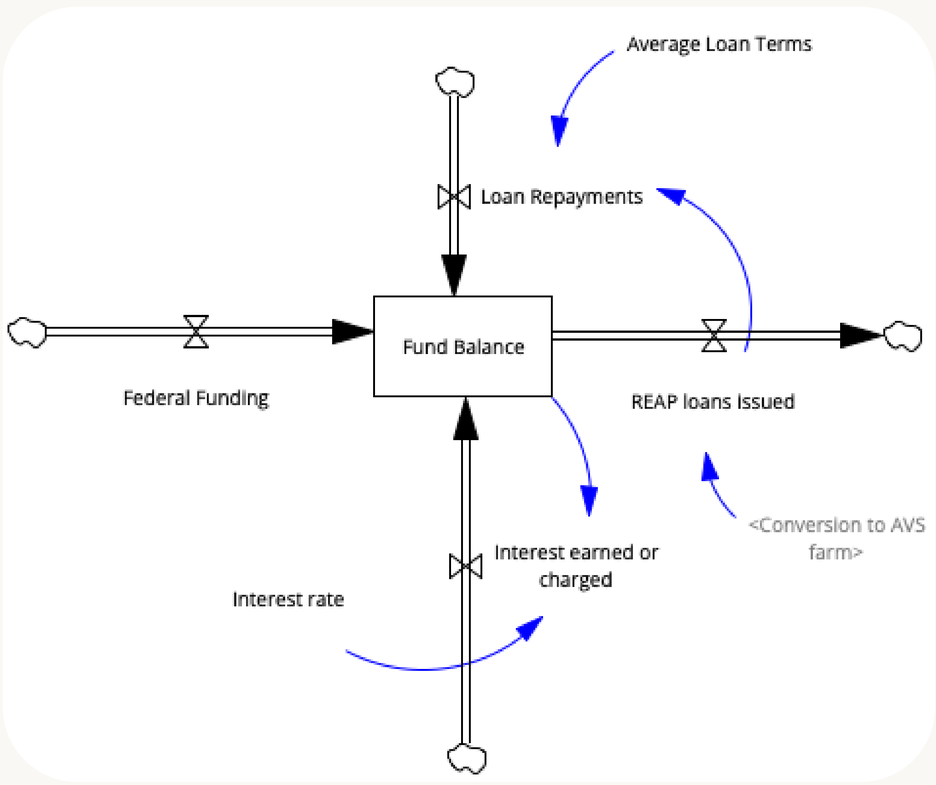
These interviews inform both the system dynamics model structure and the interpretation of adoption barriers.

SDG Alignment

This research supports multiple UN Sustainable Development Goals (SDGs) by addressing the intersection of food systems, renewable energy, and rural economic resilience. Agrivoltaics advances SDG 2 (Zero Hunger) by sustaining agricultural productivity, SDG 7 (Affordable and Clean Energy) through renewable energy expansion, and SDG 13 (Climate Action) by reducing greenhouse gas emissions. Its emphasis on financing access and inclusive policy design further contributes to SDG 10 (Reduced Inequalities), particularly for small and minority farmers. By analyzing policy frameworks, stakeholder perspectives, and land-use outcomes under varying financial scenarios, this study clarifies the economic viability of agrivoltaics and the role of incentives in guiding land-use decisions.

Dynamic Model

The model captures feedbacks between incentive availability, farm-level decision-making, and cumulative adoption over time.

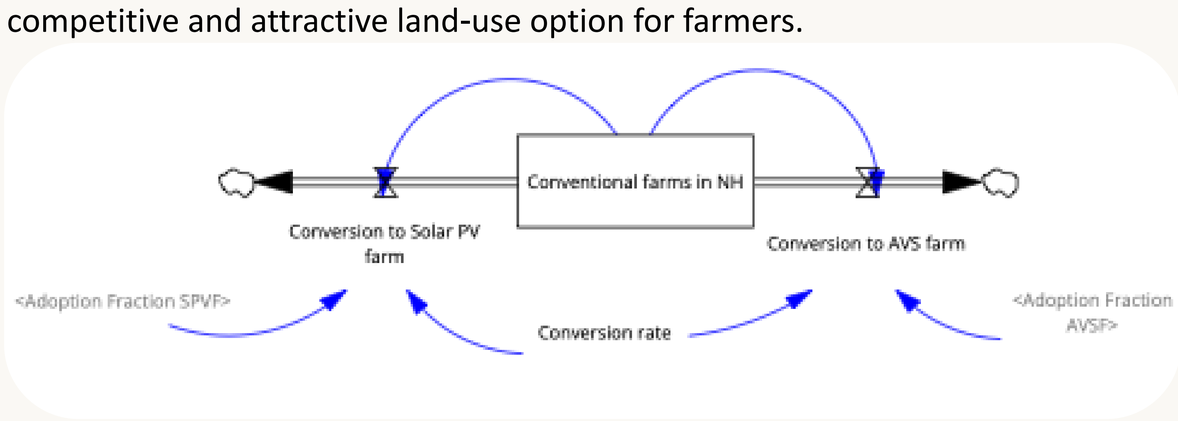


The model contains two key stocks:

1. The USDA REAP incentive fund balance represents available federal loan support and changes as funds are allocated across land-use options.
2. The decision stock captures the share of farms transitioning from conventional agriculture to either solar-PV or agrivoltaics farms. Utility functions determine technology adoption.

By linking stakeholder-identified barriers with policy-driven financial dynamics, the model enables analysis of how incentive design and uncertainty influence agrivoltaics adoption.

This allows the study to test the research hypothesis and evaluate conditions under which agrivoltaics becomes a competitive and attractive land-use option for farmers.



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