Extreme Weather and Climate Change:
A Virtual Workshop for NJ Agricultural Technical Service Providers

Hosted by the New Jersey Climate Change Resource Center
and the
New Jersey Agricultural Experiment Station

Agrivoltaics to the Rescue?

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New Jersey Agricultural Experiment Station

- Setting the stage

- In order to successfully combat climate change, we need to reduce our reliance on fossil fuels (residential, commercial, industrial, and transportation)
- Therefore, we need to increase the production of renewable energy
- In NJ, solar and wind energy are most promising (but intermittent)
- The federal government is currently promoting other energy sources
- This presentation will focus on solar energy

https://www.titanenergyne.com/

https://www.nj.com/

- Main challenges for expanding solar energy (photovoltaics) in NJ
  - Siting (roofs, parking lots, unproductive land, farmland)
  - Financing (Investment Tax Credit will soon be phased out)
  - Grid connection (available grid capacity, approval time)
  - Grid reliability (added complexity; who pays for grid maintenance?)
  - Regulations (local ordinances, farmland preservation)
  - Aesthetics (not everyone will appreciate the view)
  - Are benefits distributed equally/equitably among rate payers?

- Typical solar farm (fixed tilt angle, South facing, low to the ground)
  - Focus is on electricity production, not on farming…

~20 MW_{DC}, 100 acres
Tinton Falls, NJ

- These systems have been combined with:
  - Small animal grazing (e.g., sheep)
  - Apiaries (pollinator habitat)

- Combining agriculture with solar energy production (agrivoltaics)
  - In 2021, the NJAES initiated the Rutgers Agrivoltaics Program (RAP)
  - It's a team of 20+ staff, faculty, and students dedicated to R&D
  - We aim to investigate whether agrivoltaics can work in NJ
  - Our approach is: Agriculture first, photovoltaics second
  - We think agrivioltaics can make farming more profitable/less risky
  - Added benefit: Contributes to NJ's renewable energy mandate

Vineyard

Fruit production

Field and cover crops

RAP received funding through state appropriations to install agrivoltaic systems at 3 research farms

Locations

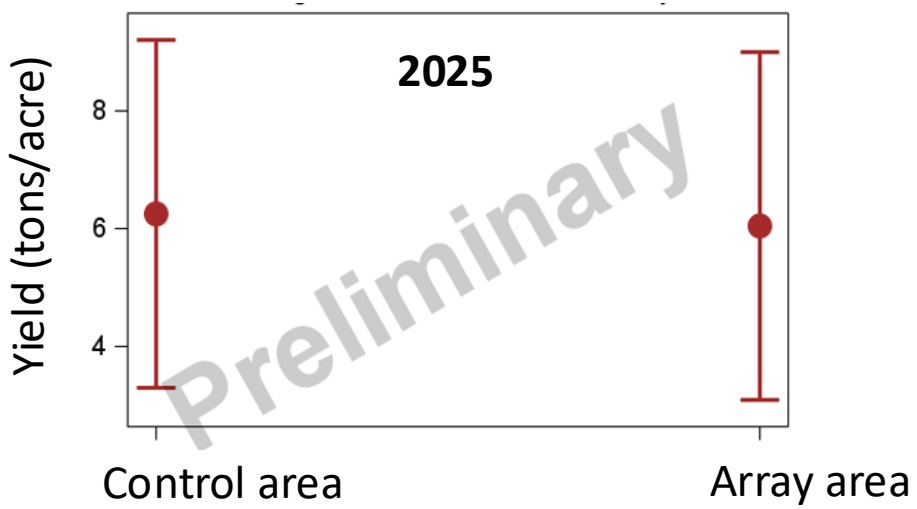
1. Rutgers Animal Farm, New Brunswick, NJ
2. Rutgers Agricultural Research and Extension Center, Bridgeton, NJ
3. Clifford E. & Melda C. Snyder Research and Extension Farm, Pittstown, NJ

Animal Farm: 170 kW_{DC} vertical bifacial: **Grazing large animals and forage production**. Three randomized blocks, each with a control area, three rows with 61 cm (2 feet) clearance height, and three rows with 1.22 m (4 feet) clearance height. Row spacing: 6.1 or 12.2 m (20 or 40 feet). Each row has 21 vertical bifacial panels (oriented East or West; 1P). Utility: PSE&G.

RAREC: 255 kW_{DC} installed, 48.6 kW_{DC} grid-connected, single-axis trackers with a pivot point 2.4 m (8 feet) above ground level: **Soybean and vegetable crop production**. Three randomized blocks, each with a control area, three rows with single rows of bifacial panels (1P), and three rows with double rows of bifacial panels (2P). Row spacing: 10.4 m (34 feet). Utility: ACE.

Snyder Farm: 95 kW_{DC} installed, 82.4 kW_{DC} grid-connected, single-axis trackers with a pivot point 2.4 m (8 feet) above ground level: **Hay production**. Two treatment blocks, each with a control area and five rows with single rows of bifacial panels (1P). Row spacing: 9.8 m (32 feet). Utility: JCP&L.

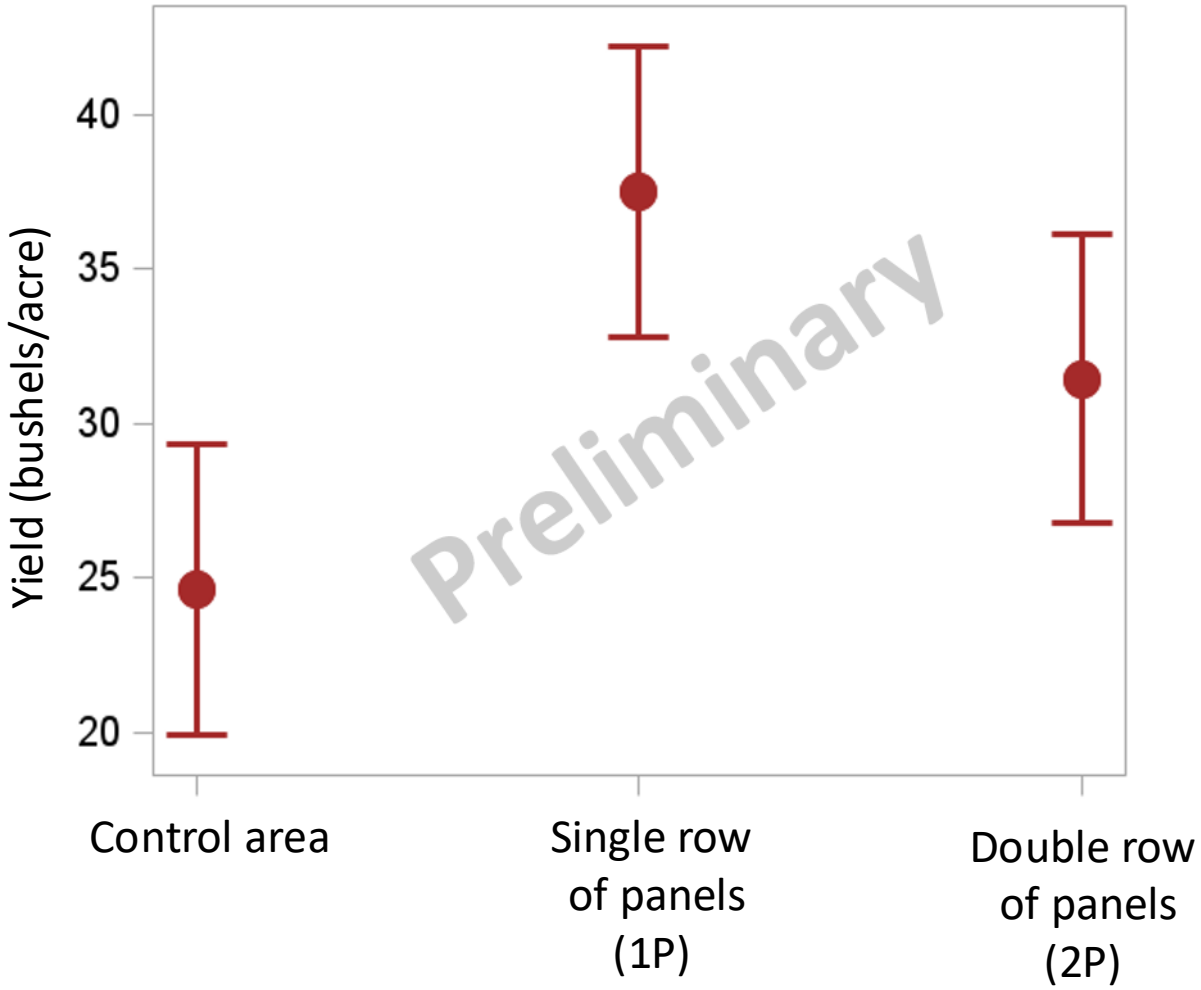
- Preliminary results Snyder Farm (Hay, 2024 and 2025)



No effect of the solar array

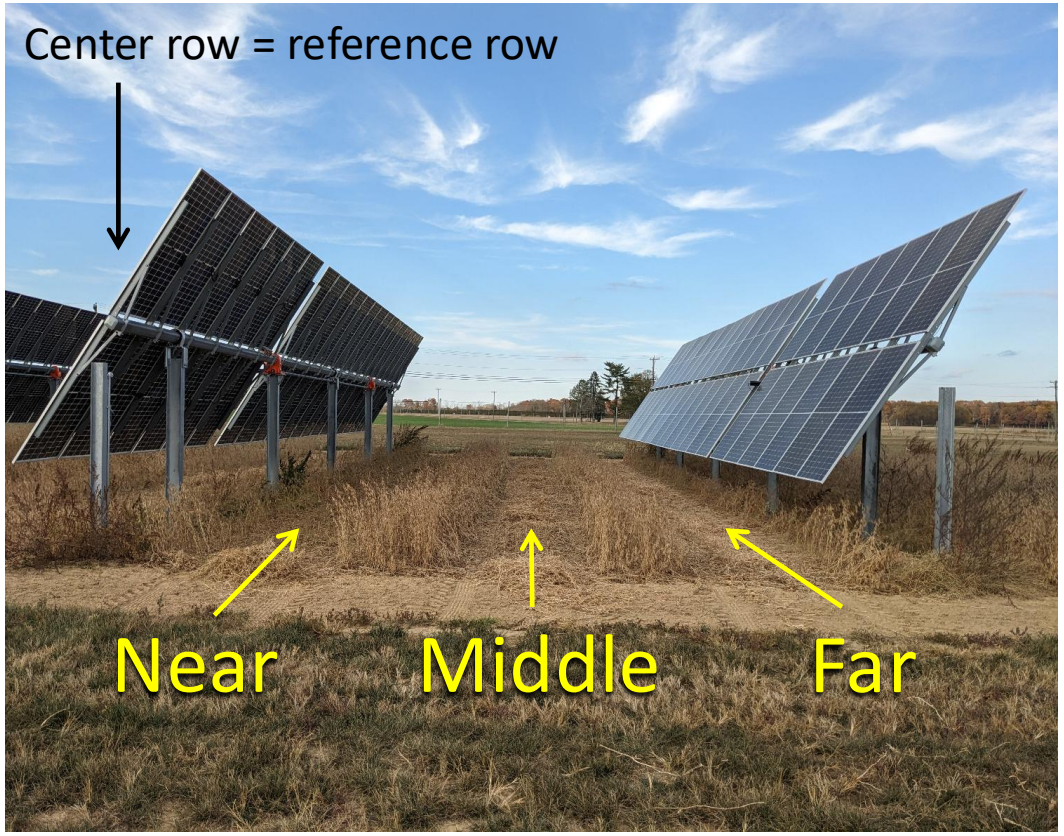
- Preliminary results RAREC (Soybean, 2024)

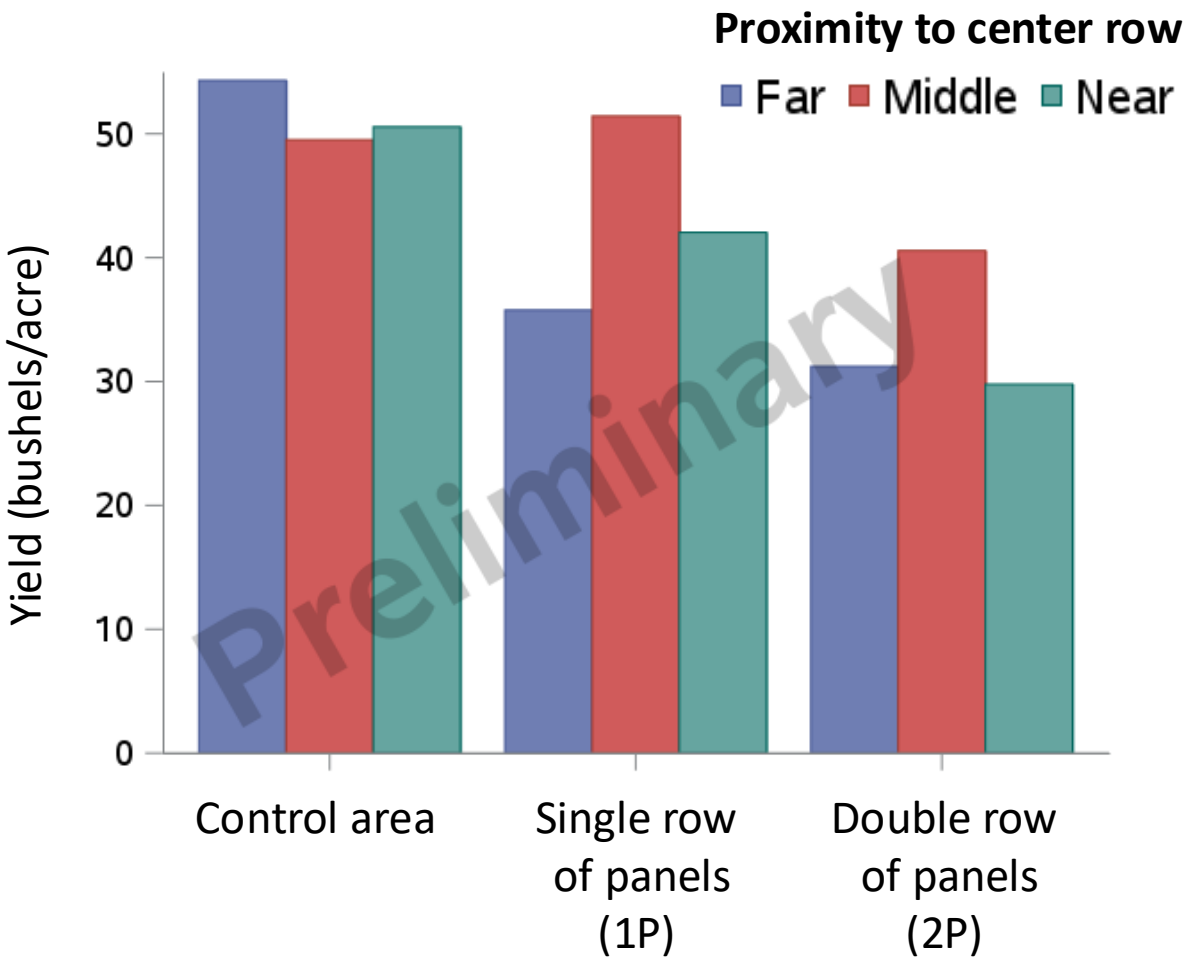
Note: The driest Sep. & Oct. in recorded history



In 2024, both types of solar arrays had significantly higher yield than the control area

- Preliminary results RAREC (Soybean, 2025)





In 2025, significant yield interaction of array type with proximity to the center row. Lower yields closer to the rows in the 1P and 2P arrays, but not the control.

- State legislature enacted the Dual-Use Solar Energy Pilot Program

  - Implemented by the NJBPU in collaboration with NJDA, NJDEP, and RAP (advisory role)
  - Program capacity: Up to 200 MW over three years (phase 1)
  - Application window for PY1 closes on February 25, 2026
  - Approval/denial decisions expected sometime late summer 2026
  - Incentive (in the form of renewable energy credits): Base incentive ($64.71/MWh) plus a project specific adder requiring BPU approval
  - RAP will assist with collecting research data from each project
  - Lessons learned from the Pilot Program will be used to propose a permanent dual-use solar energy program for NJ

- In conclusion

- RAP's activities are at the cutting edge of U.S. agrivoltaics research
- So far, we've generated 777 MWh of electricity (72 homes for 1 yr)
- Preliminary research results suggest potential for agrivoltaics in NJ
- RAP is contributing in a variety of ways to the Dual-Use Pilot Program
- The first Dual-Use Pilot Program projects could be operational by '27
- Whether agrivoltaics will be widely adopted by the NJ farming community remains to be seen
- Nevertheless, the RAP team sees opportunities for a number of different agricultural and horticultural applications

Thank You !!

For more information:
https://agrivoltaics.rutgers.edu/