## **Agrivoltaics Crop Research**



New Jersey Agricultural Experiment Station





Agrivoltaics.Rutgers.edu



### Rutgers Agrivoltaics Program – A Diverse Team:

A.J. Both\*, Bill Bamka, Thierry Besançon, Dunbar P. Birnie, III, Clint Burgher, Daniel Giménez, Serpil Guran, Michael Kornitas, Rebeca Mata Barboza, Peter Nitzsche\*, David Robinson, W. Ross Rucker, Ethan Schoolman, Shawn Sorrels, David Specca, Kevin Sullivan, **Dan Ward\***, Mike Westendorf, and **Andy Wyenandt** 

\*thanks to these members of the team for photographs.

Our mission is to assess the viability of agrivoltaics in New Jersey and better understand the challenges and opportunities that come with combining agricultural production and solar power generation on the same piece of land.

### **Agrivoltaics at Rutgers/NJAES Farms**



Note: All arrays have bifacial panels. All arrays are connected to a utility.



As the sun crosses the sky, the shadows cross the field

### On a cloudy day, the shadows are indistinct

### Single-axis trackers with single rows of panels (1P) Rows oriented North – South

Snyder Farm, Pittstown, NJ

### Snyder Farm, Pittstown, NJ



Jersev Central

View looking East

**Bifacial panels** 

95 kW<sub>DC</sub> installed, 82.4 kW<sub>DC</sub> 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 panels. Row spacing: 9.8 m (32 feet).













Note: Dots indicate means of 12 plots. Error bars indicate 95% confidence intervals.

### • RAREC, Upper Deerfield, NJ



100 100 10

**Bifacial panels** 

Blue: experimental block Red: control areas

View looking East

255 kW<sub>DC</sub> installed, single-axis trackers with a pivot point 2.4 m (8 feet) above ground level: Staple and vegetable crop production. Three randomized blocks, each with a control area, three rows with single rows of panels, and three rows with double rows of panels. Row spacing: 10.4 m (34 feet).















Sector Rutgers Agrivoltaics Program 2024©





![](_page_25_Picture_0.jpeg)

![](_page_26_Picture_0.jpeg)

![](_page_27_Picture_0.jpeg)

![](_page_28_Picture_0.jpeg)

![](_page_29_Picture_0.jpeg)

![](_page_30_Picture_0.jpeg)

![](_page_31_Picture_0.jpeg)

![](_page_32_Picture_0.jpeg)

![](_page_33_Picture_0.jpeg)

![](_page_34_Picture_0.jpeg)

#### Proximity to the Central Array Row

![](_page_35_Figure_1.jpeg)

![](_page_36_Figure_0.jpeg)

![](_page_37_Figure_0.jpeg)

![](_page_38_Figure_0.jpeg)

![](_page_39_Figure_0.jpeg)

![](_page_40_Picture_0.jpeg)

![](_page_41_Picture_0.jpeg)

### Rutgers Agrivoltaics Program 2024©

![](_page_42_Picture_1.jpeg)

![](_page_43_Picture_0.jpeg)

#### Soybean Yield in 2024

Note: Our first year was the driest Sept. and Oct. in all history

![](_page_44_Figure_2.jpeg)

Note: Dots indicate means of 12 plots. Error bars indicate 95% confidence intervals.

### Animal Farm, New Brunswick, NJ

![](_page_45_Picture_1.jpeg)

#### Vertical bifacial panels

![](_page_45_Figure_3.jpeg)

170 kW<sub>DC</sub>: 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).

![](_page_46_Picture_0.jpeg)

### Vertical bifacial (VBF) with North – South rows

Cook Campus Animal Farm

New Brinswick NI

![](_page_48_Picture_0.jpeg)

**New Jersey Agricultural Experiment Station** 

# Thank you! Questions?

![](_page_48_Picture_3.jpeg)

![](_page_48_Picture_4.jpeg)

Dan Ward

danward@njaes.rutgers.edu Agrivoltaics.Rutgers.edu