COLORADO STATE UNIVERSITY
EXTENSION

AGRIVOLTAICS: FROM FARM FIELDS TO ROOFTOPS
FRONT RANGE AND EASTERN PLAINS

Intern:
Blake Gornick

Mentors:
Dr. Jennifer Bousselot (Assistant Professor)
Todd Ballard (Agronomist, CSU Extension)
Ron Meyer (Agronomist, CSU Extension)

PROJECT INTRODUCTION

Agrivoltaics combines both agriculture and energy production on the same land in the form of co-locating solar panels and crops. Through co-locating both solar panels and crops, land productivity can increase by as much as 35-73%.[1] Optimizing land productivity has become increasing important as populations expand and the climate crisis worsens.

Agricultural, fuel, and energy industries all compete for land. Agrivoltaics allows both agricultural and energy industries to be successful on the same land areas. Solar arrays account for the highest share of green energy production installations each year and will continue to take up more and more land.

There is a harmony between the crops and the solar panels above them. Plants retain more water as a result of the solar panel's shade, leading to a lower amount of irrigation. There is also less heat stress to plants located below the panels.[2] Additionally, as extreme weather events become more frequent, solar arrays have the potential to protect plants from events like hail.

The potential for agrivoltaic systems is endless with possibilities ranging from growing grapes, raising livestock, to electrifying villages in rural agricultural areas.

INTERNSHIP GOALS

- To gain experience in the Extension, agriculture, horticulture, green roofs, and solar industries
- Learn about the subject of agrivoltaics, applications, costs, benefits, and data collection

RELATION TO AG-BUSINESS DEGREE

I am pursuing my bachelors in agricultural business and take much interest in how technology is going to affect agriculture as we know it. Interning for this agrivoltaics project was an invaluable experience. It opened my eyes to the possibility of a new revolutionary chapter in agriculture in the form of agrivoltaics.

INTERNSHIP ACTIVITIES

- Construction of rooftop agrivoltaic study plot at CSU Foothills Campus
- Data collection at rooftop agrivoltaic plot and plot at ARDEC South
- In process of of drafting a fact sheet on the topic of agrivoltaics
- The agrivoltaic project was mentioned in a press release
- Trip to wheat field day in Sedgwick county to view newly bred wheat varieties
- Tour of Jack's Solar Garden in Longmont, Colorado
- Trips to Sterling, Colorado for Sorghum plant counts and tour various Extension sites

Construction of Rooftop Agrivoltaics Study Plot at CSU Foothills

CONCLUSIONS AND NEXT STEPS

Unfortunately, the duration of this internship concludes in the midst of data collection. Therefore, we do not have all the necessary data yet to come to a conclusion based on numbers. Although, during our data collections, visually it seemed as if the plants located under partial/full shade were less stressed than those in full sun. I look forward to seeing the final outcome.

I was fascinated by the scale of wheat farming during my visits to the eastern plains of Colorado. In particular, how an entire county could be harvested in just a few days. During the wheat field day I attended, I also learned how farmers choose types of wheat based on different engineered characteristics.

ARDEC South Study Plot

REFERENCES

1) Dupraz, C., Marrou, H., Talbot, G., Dufour, L., Nogier, A., & Ferard, Y. (2011). Combining solar photovoltaic panels and food crops for optimising land use: Towards new agrivoltaic schemes. *Renewable energy*, *36*(10), 2725-2732.

2) Majumdar, Debaleena, Pasqualetti, Martin J. 2018. "Dual use of agricultural land: Introducing 'agrivoltaics' in Phoenix Metropolitan Statistical Area, USA." Landscape and Urban Planning, 170: 150-168.