

# Crops and Machinery for Cultivation in Agrivoltaic Systems

## Description of an Ongoing Research Project

### Summary

In Skåne in southern Sweden, the country's most fertile arable land is found. At the same time, interest in establishing solar parks on farmland is increasing. The Solbruk Skåne project aims to demonstrate, develop, and disseminate on how to manage the potential conflict between food production and solar power. In Work Package 3 (WP3) in Solbruk Skåne, we address a significant knowledge gap regarding machinery systems best suited to these cultivation conditions, as well as crop yields and quality that can realistically be expected.

### Introduction

- In Sweden, the total area of arable land has been declining and this is considered to be of national importance.
- Interest in establishing photovoltaic (PV) parks on arable land has grown rapidly.
- There is a knowledge gap about expected crop yields and machine systems best suited in agrivoltaic systems (AVS)

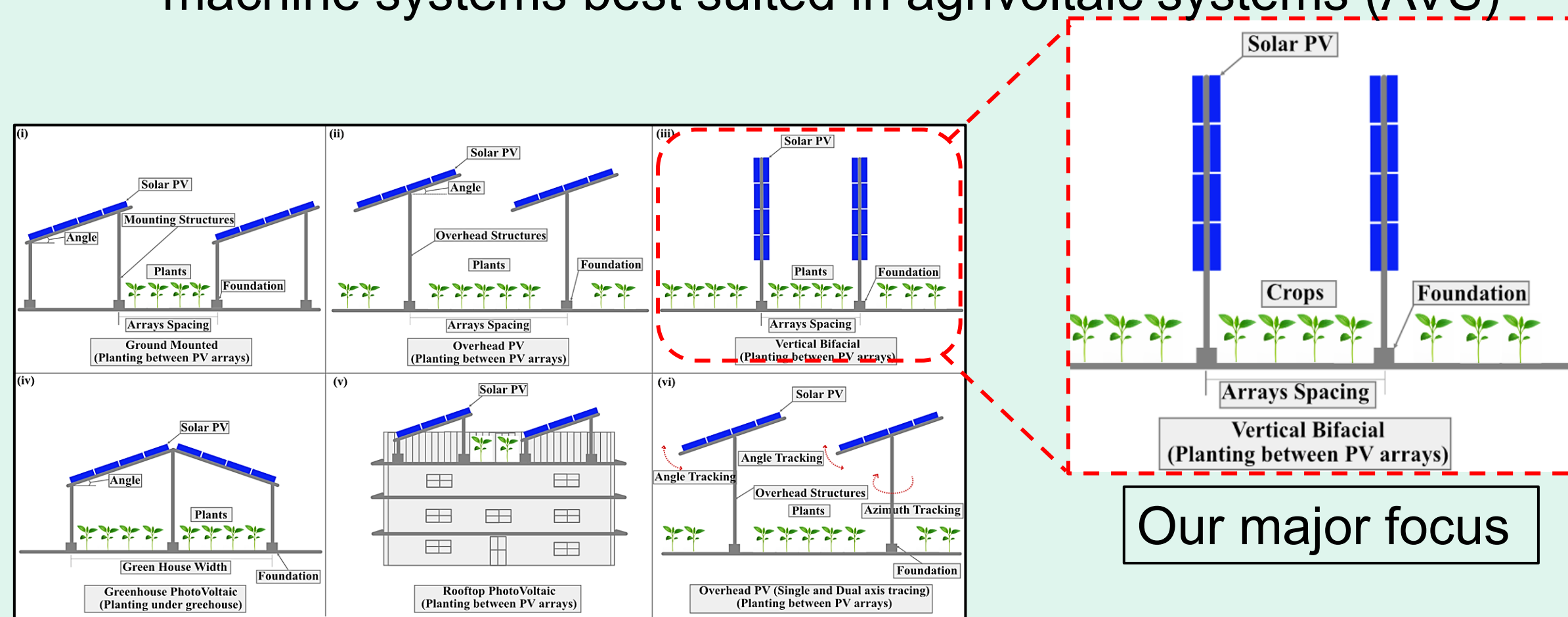


Fig. 1: Different types of AVS system and our major focus

### Research Questions

- How should agrivoltaic parks be designed with respect to working width and operational conditions of modern farm machines used in cultivation?
- What are the impacts of different photovoltaic setup on energy generation and crop yields?
- Which technical solar panel parameters should be considered, given the climatic conditions in southern Sweden?

### Methodology

- Performance and costs of farm machine operations in agrivoltaic parks using a dynamic simulation model.
- Investigation of field traffic and soil compaction due to machines in agrivoltaic parks.
- Crop cultivation trials (when a test facility has been built).

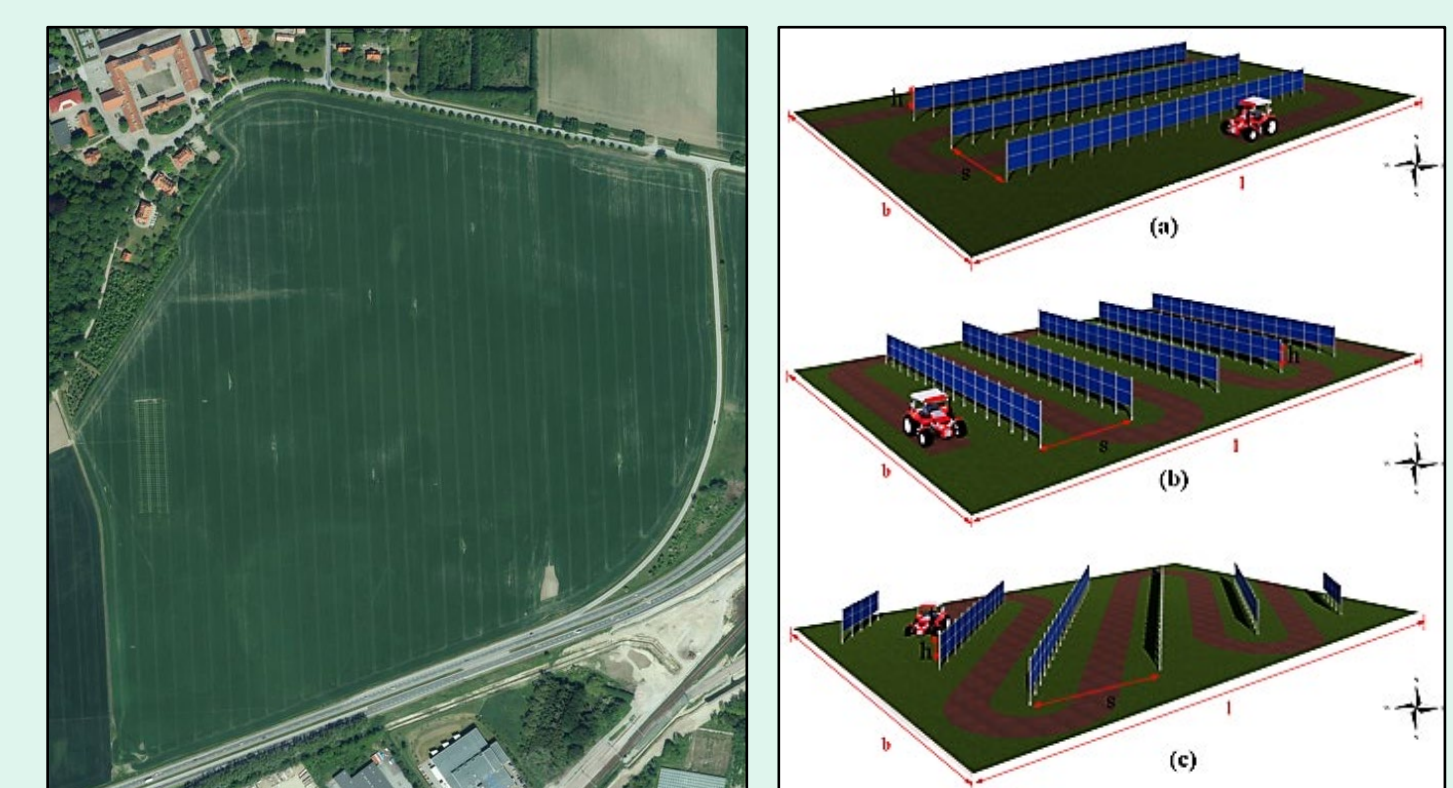
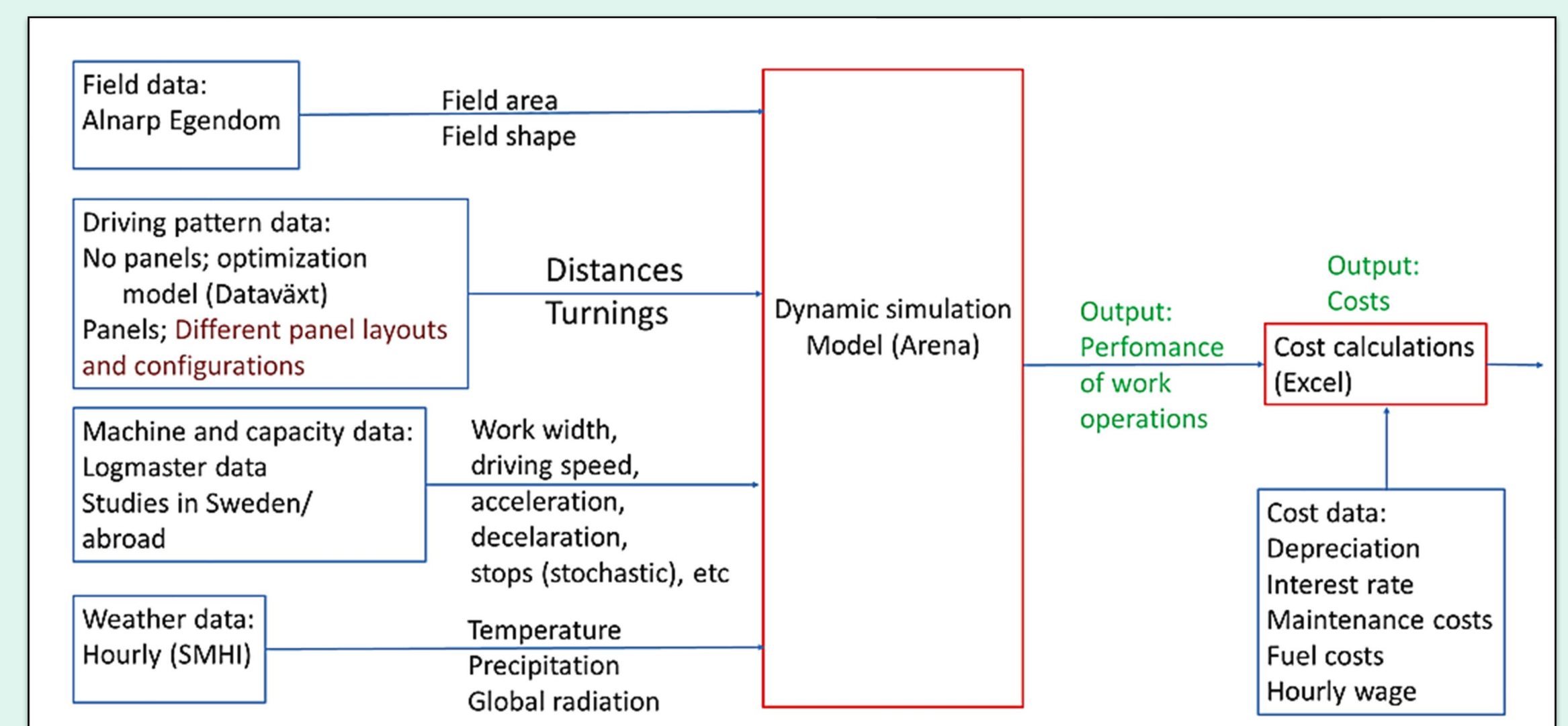


Fig. 2: Methodology, field consideration, and vertical bifacial agrivoltaics system with three different orientations

### Expected Outcomes

- There is a great interest about the project's results in the agricultural and energy sectors. Some outcomes of WP3 are:
- Economically reasonable combinations of PV design and choice of crops/crop rotations in agrivoltaic parks under Scanian cultivation conditions.
  - Recommendations on efficient and profitable use of machines in agrivoltaic parks.
  - Dissemination of results to farmers, land owners, investors, advisors, etc. Publications in scientific journals.



**Ananta Acharya**  
 Doctoral Student  
[ananta.aacharya@slu.se](mailto:ananta.aacharya@slu.se)  
 Department of Biosystems and Technology



**Daniel Nilsson**  
 Senior Lecturer  
[daniel.nilsson@slu.se](mailto:daniel.nilsson@slu.se)  
 Department of Biosystems and Technology