

# Drone-Based Identification of Flood-Tolerant Maize Genotypes

**Authors:** Mitchell, Madison<sup>1</sup>; Sidberry, Grace<sup>1</sup>; Washburn, Jacob, D.<sup>2</sup>;

1. Division of Plant Sciences and Technology, University of Missouri, Columbia, MO 65211

2. USDA-ARS Plant Genetics Research Unit, USDA-ARS, Columbia, MO 65211



## Overview

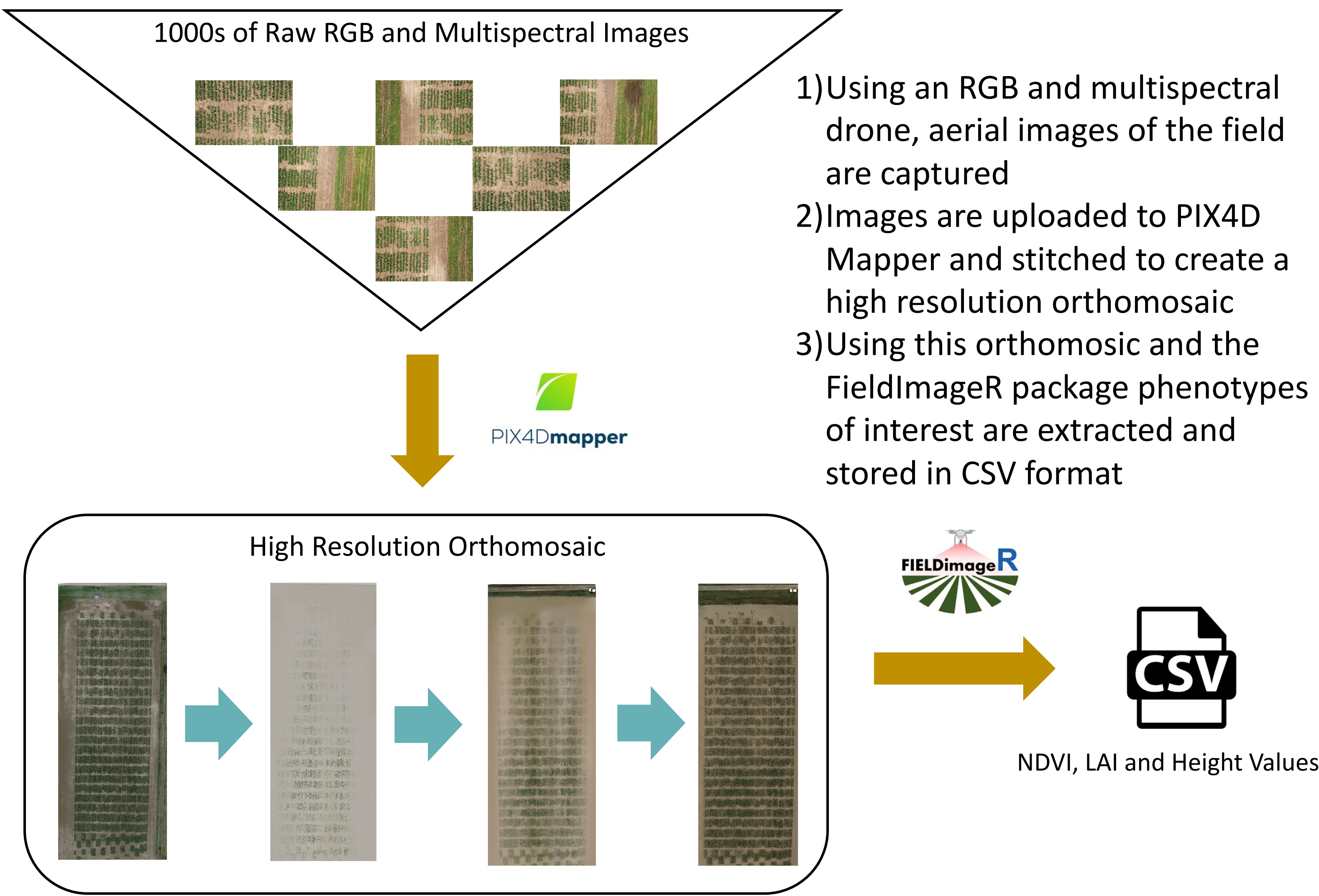
- As climate change progresses the damage to crops such as maize will increase causing a projected three billion dollars in crop damage annually by 2030
- As flooding events become more prevalent safe and accurate phenotyping will be essential. This is where UAV analysis has a chance to shine
- Taking advantage of a natural flooding event, UAV images of Rollins Farm Field 5 in Columbia, MO were used to analyze the impacts of flooding on knee high maize
- The field was completely submerged for over 24 hours
- There were two separate peaks in the flood: 23.45 ft and 19.44 ft



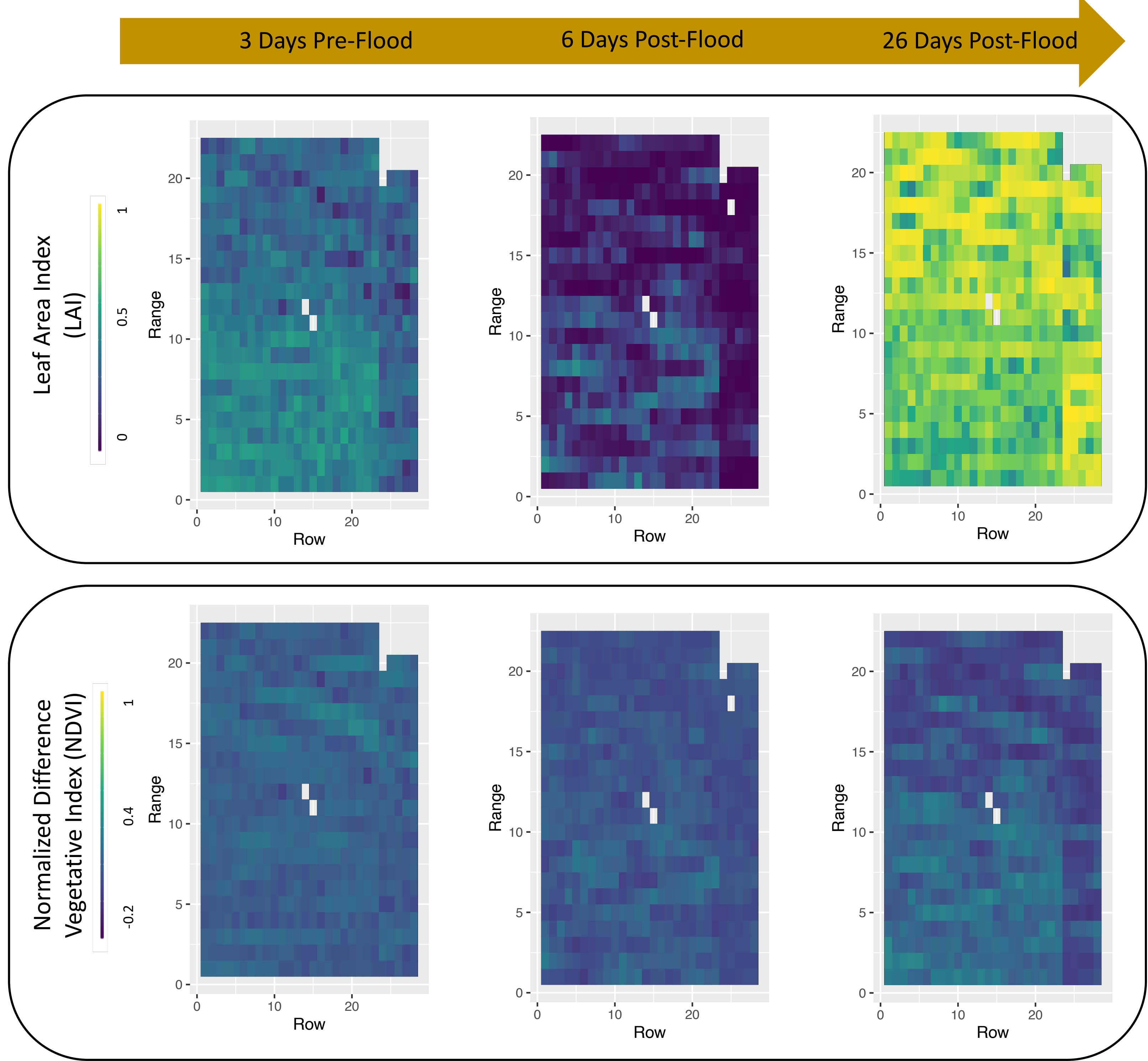
### DRIVING QUESTIONS:

- How does the location in the field impact the damage and recovery?
- Does the maturity of the plant pre-flood increase survival rate?
- How is genotype correlated with survival?

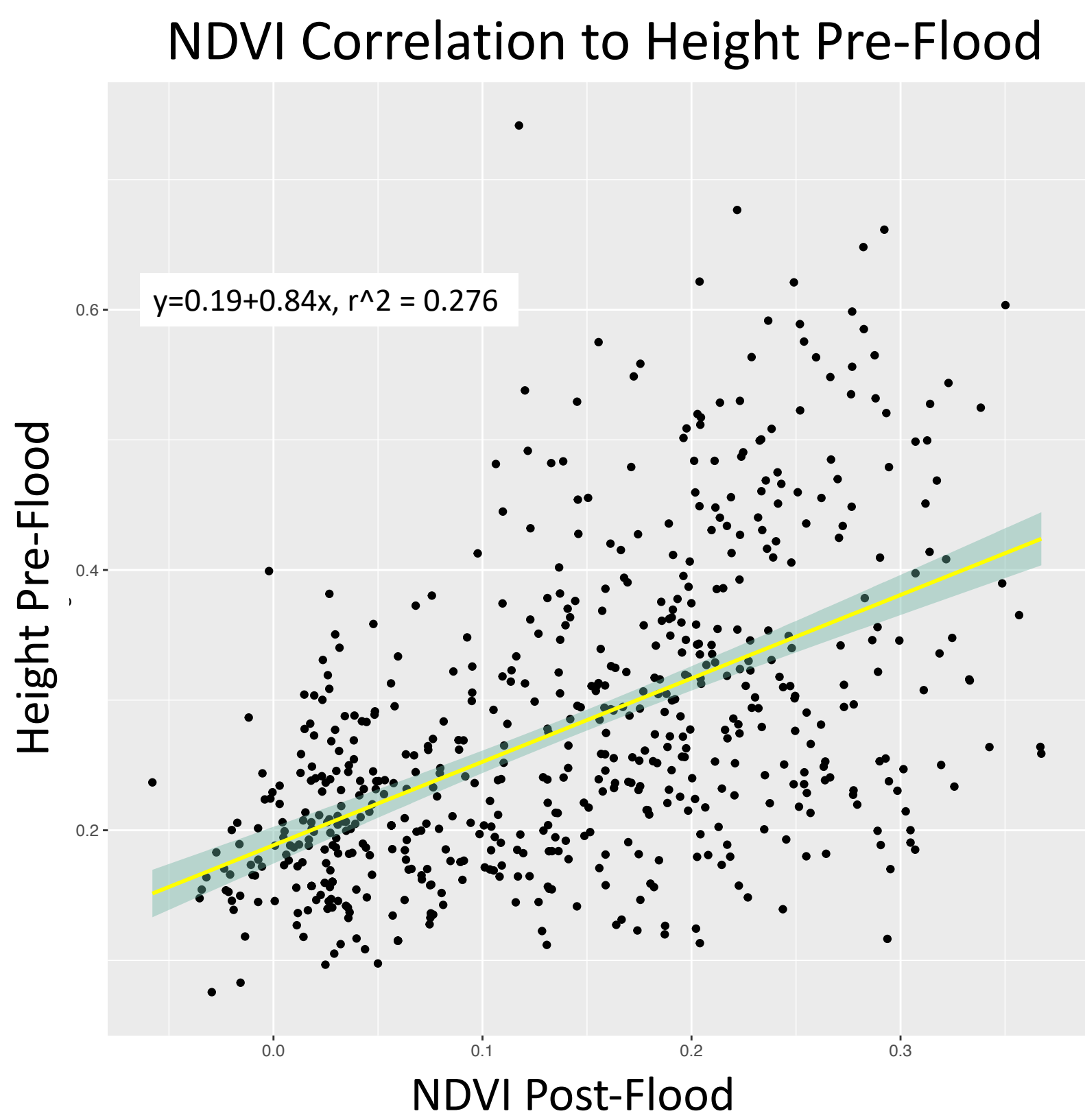
## Image Processing Pipeline



## Relationship to the Field



## Future Directions



### QUESTIONS MOVING FORWARD:

- How can we mitigate the impacts of field location on success and recovery rates?
- How can we account for the mud/debris on the plants within the field?
- What does the root architecture of the best genotypes look like?

**Acknowledgements:** A big thank you to Daniel Kick for aiding in the development of statistical figures. Thank you Harper Lafond for help with image processing. Funding provided by USDA-ARS

**References:** USGS Graph: <https://waterdata.usgs.gov> ,CSV File: data:image/png, Climate Change Stat: Cynthia Rosenzweig, Global Environmental Change, Volume 12 Issue 3

**CORRESPONDANCE:**  
Email: [mnmzbd@umsystem.edu](mailto:mnmzbd@umsystem.edu)  
LinkedIn: [linkedin.com/in/madi-mitchell-0abb3a21b](https://www.linkedin.com/in/madi-mitchell-0abb3a21b)