

Monitoring Cane Yield by Measuring Mass Flow Rate Through The Harvester

Graeme Cox,

Harry Harris, Randolph Pax and Robert Dick

University Of Southern Queensland



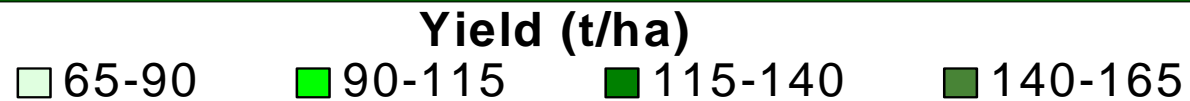
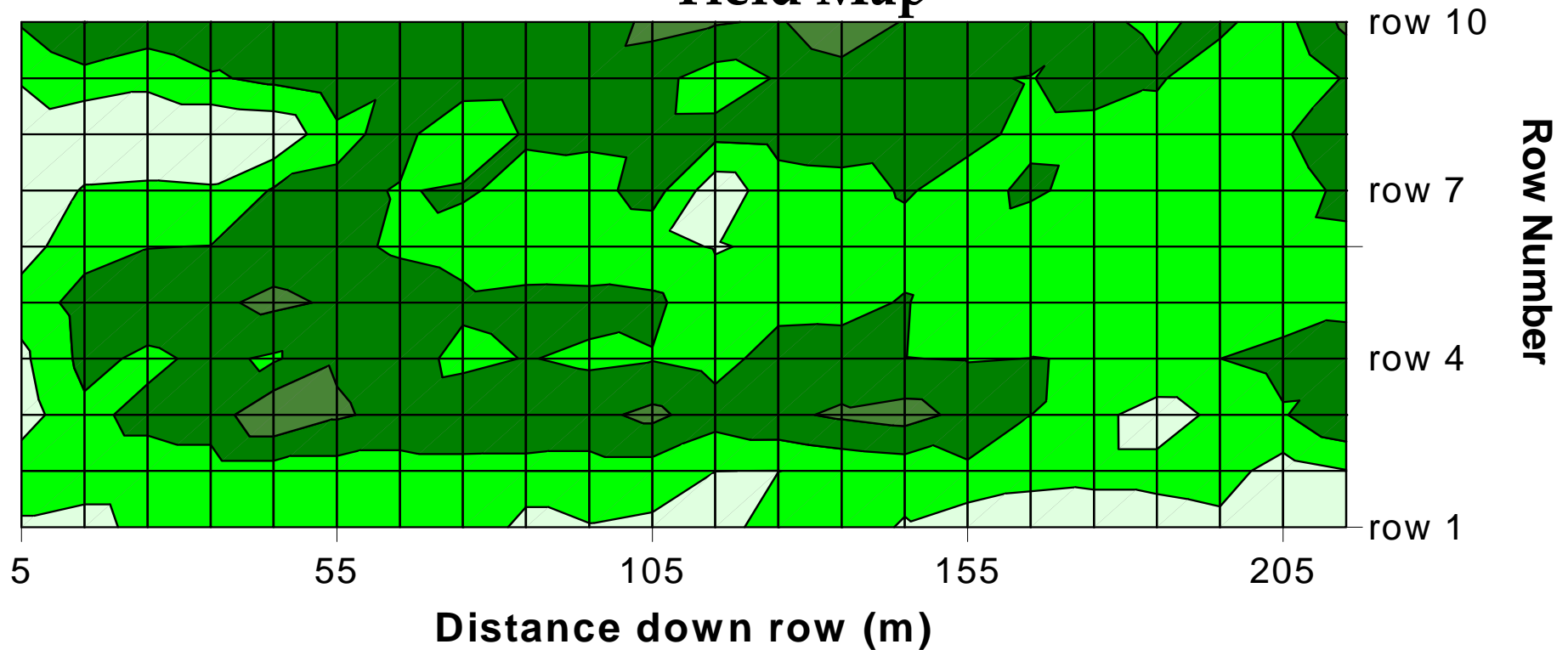
Introduction

- Why Monitor Cane Yield?
- How Yield Is Measured
- How To Measure Mass Flow?
- Results of Experiments
- Conclusions



Why Monitor Cane Yield?

Yield Map



How to Measure Yield?

□ During Harvesting

$$\square \text{Yield (t/ha)} = \frac{\text{Mass Flow Rate (Kg/s)}}{(\text{Speed (m/s)} \times \text{Row Spacing (m)})} \times 10$$

- Row Spacing ✓
- Speed Measurement ✓
- Mass Flow Rate Measurement ?

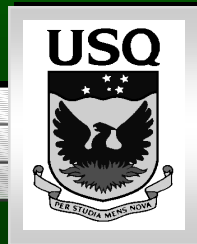
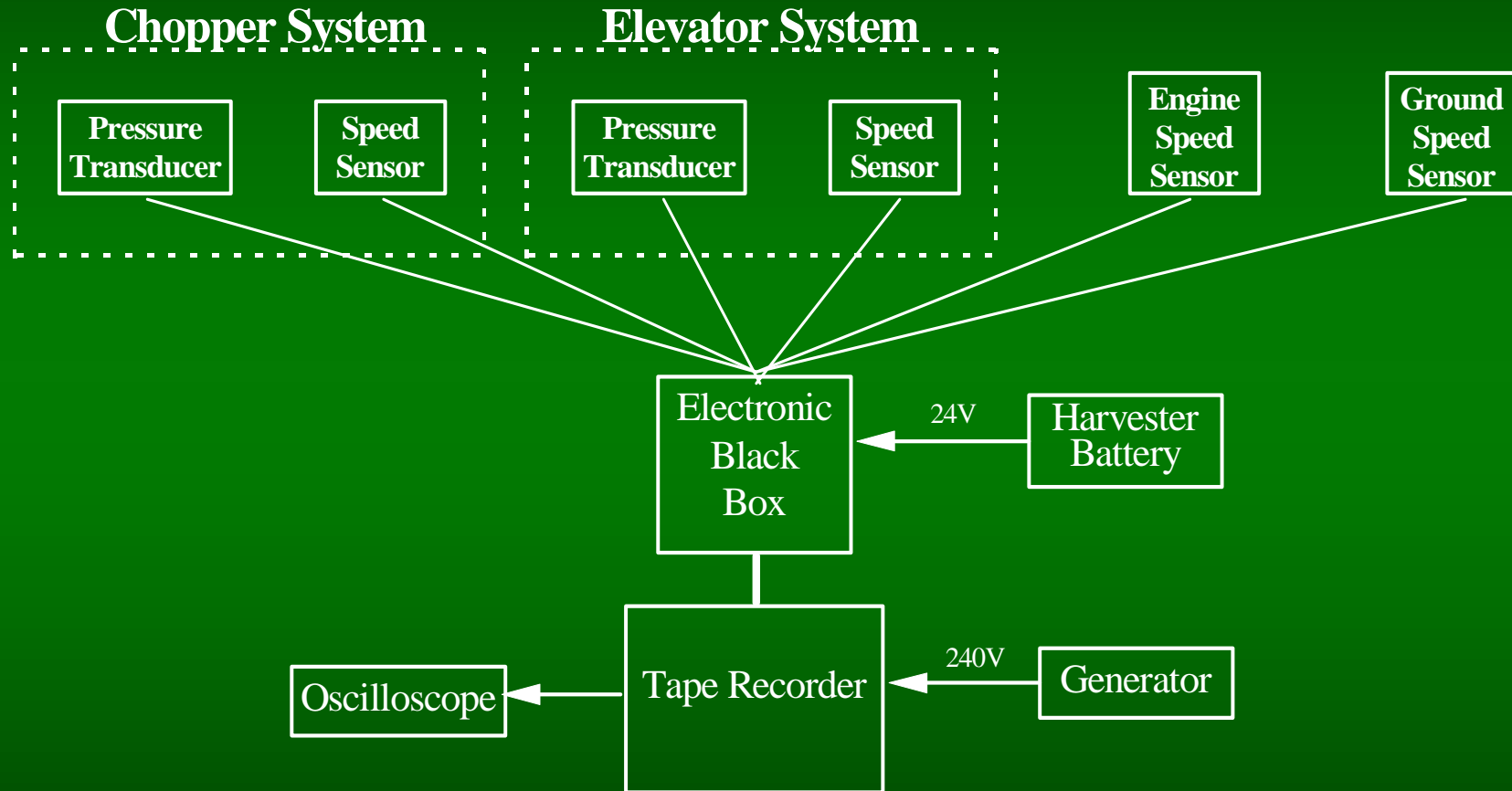


How To Measure Mass Flow?

- Hypothesis:
 - » “Mass Flow **Proportional** Power to Process”?
- Use
 - Elevator Power
 - or Chopper Power
- Planned & Conducted experiments
- Instrumentation



Instrumentation

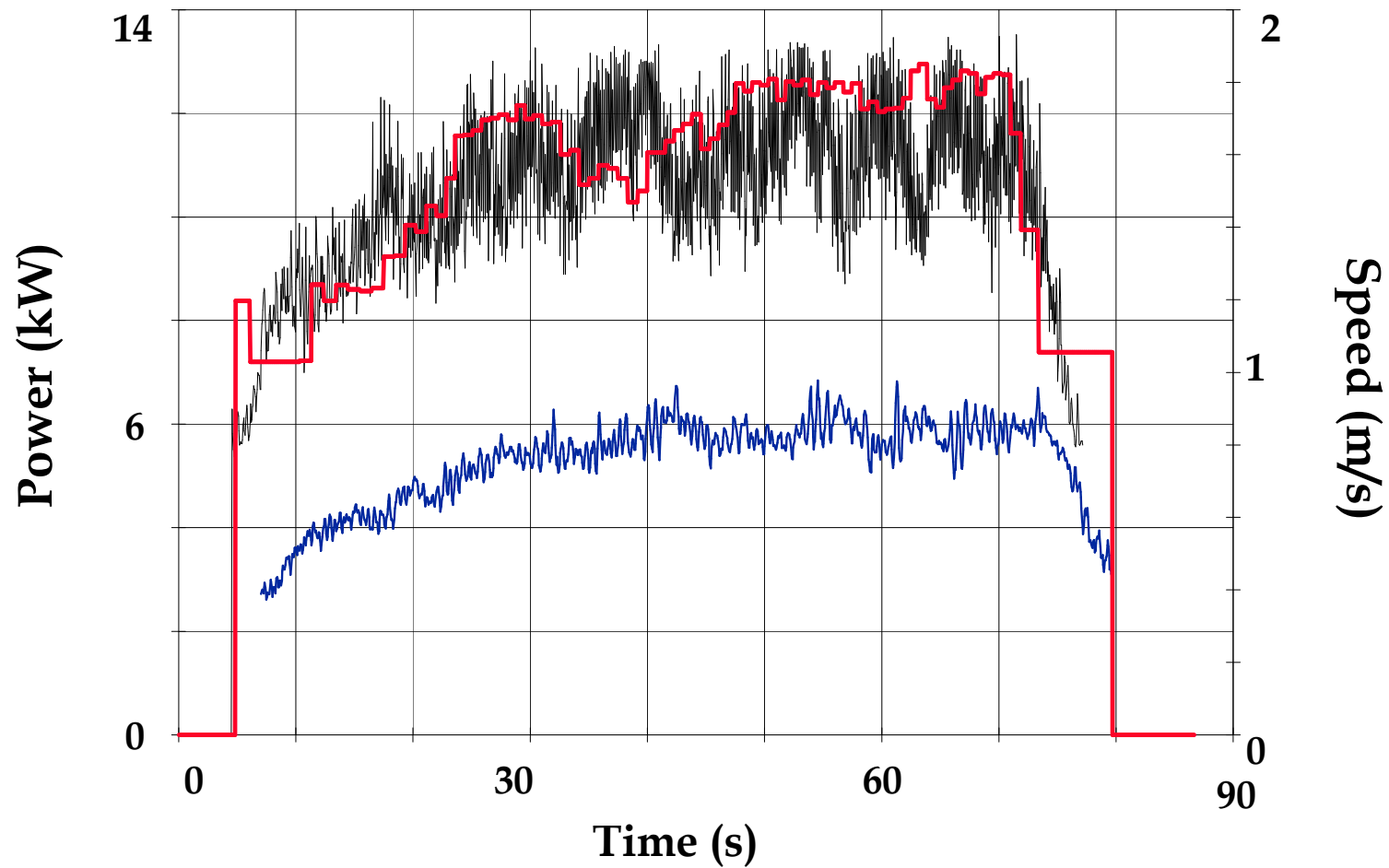


Results of Experiments

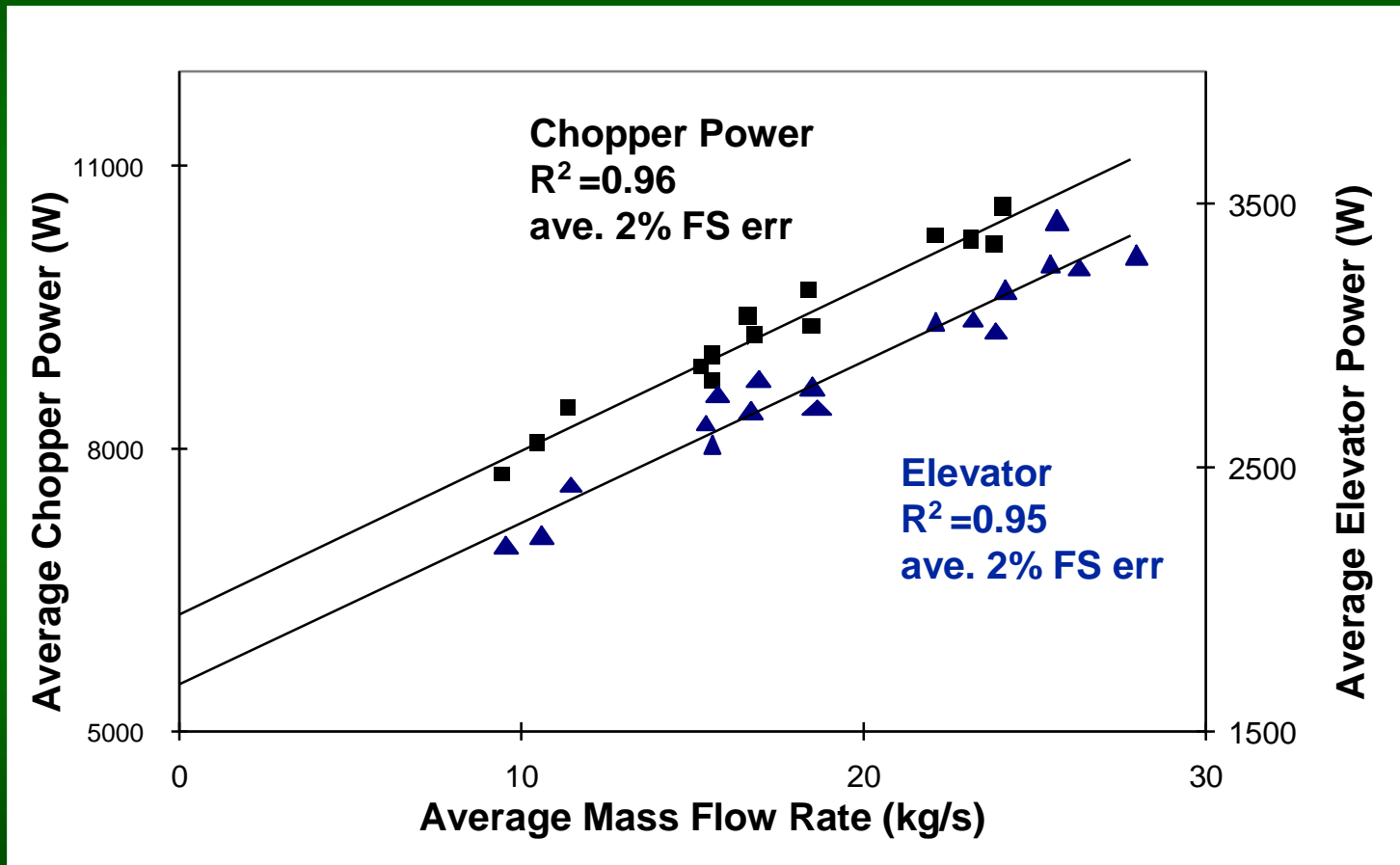
- Experimental Data
- Calibration Curves
- Yield Map



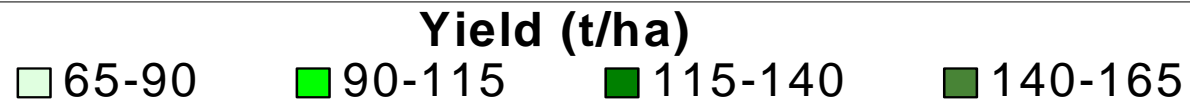
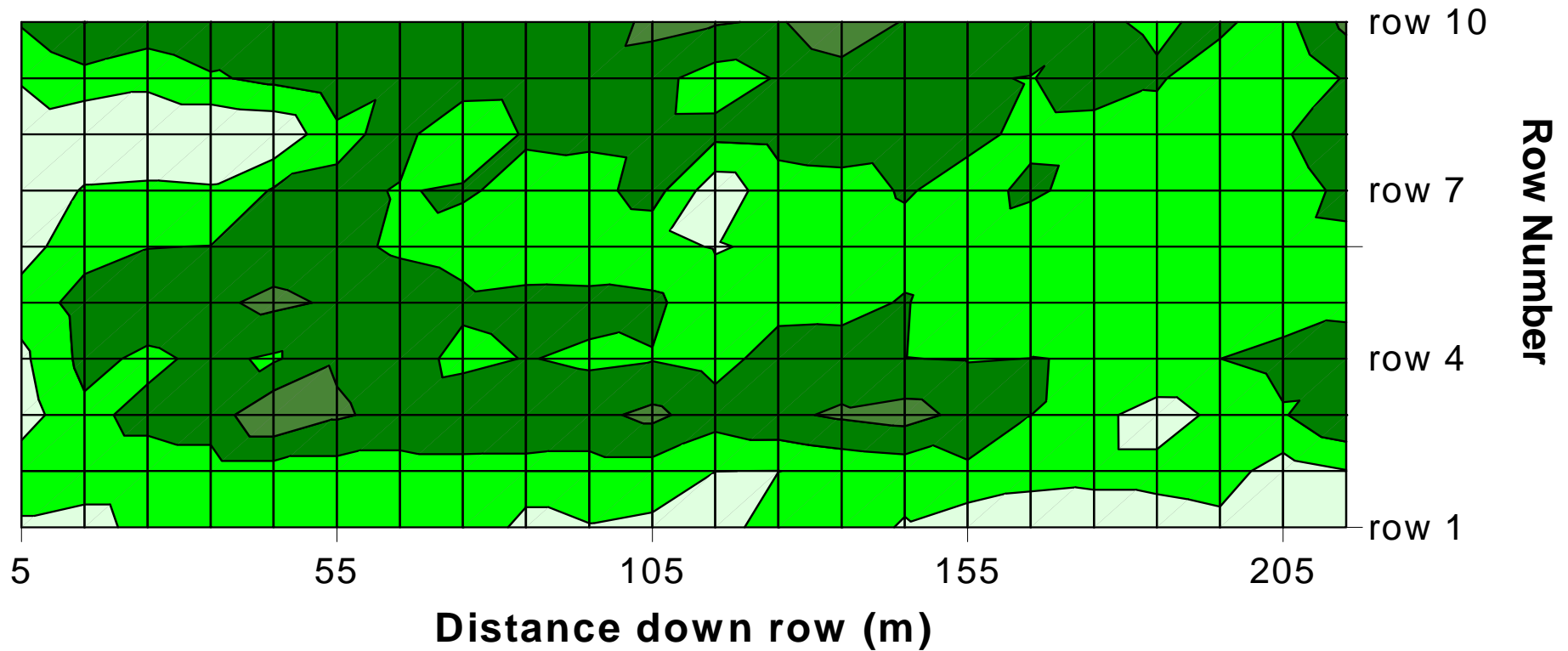
Experimental Data



Calibration Curves



Yield Map



Conclusion

- Successfully measure mass flow by measuring the elevator or chopper power consumption during harvest.
- Yield Mapping is Feasible
- Future
 - Further experiments to test accuracy
 - Developing a Prototype System
 - to Yield Map 700 ha this season in the Burdekin
- Gratefully Acknowledge SRDC for funding and BSES Bundaberg for assistance.

