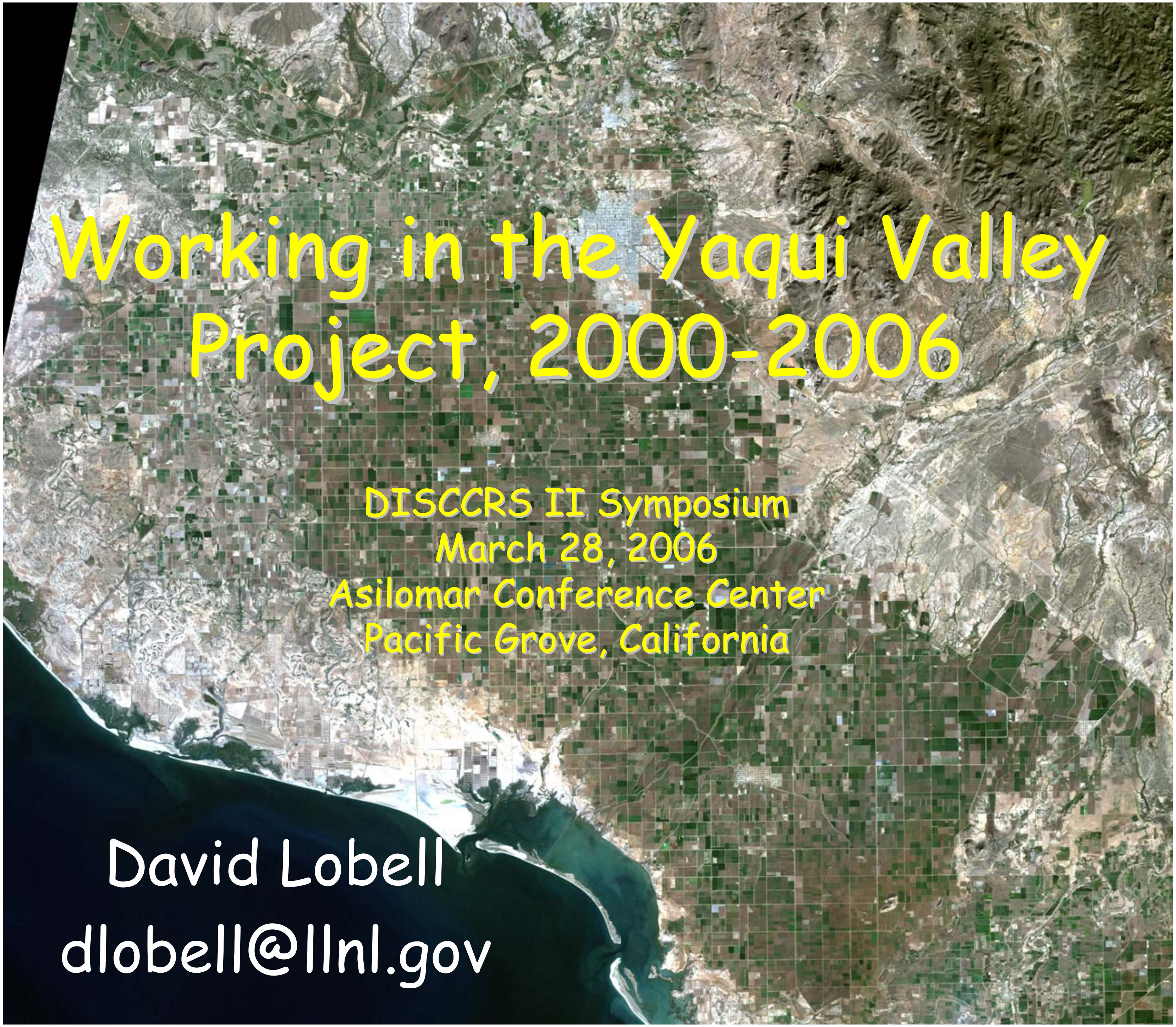


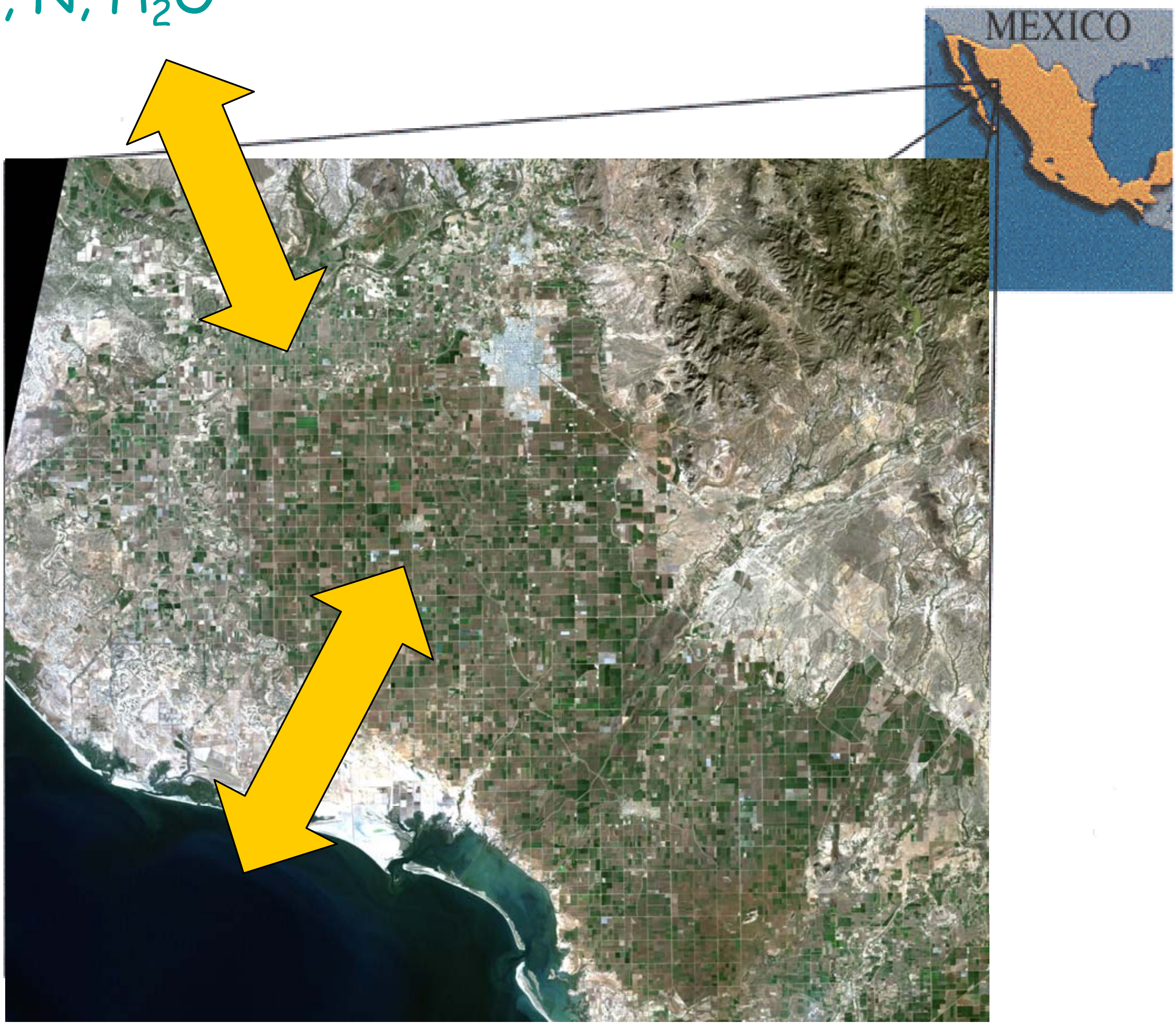
Working in the Yaqui Valley Project, 2000-2006

DISCCRS II Symposium
March 28, 2006
Asilomar Conference Center
Pacific Grove, California

David Lobell
dlobell@llnl.gov

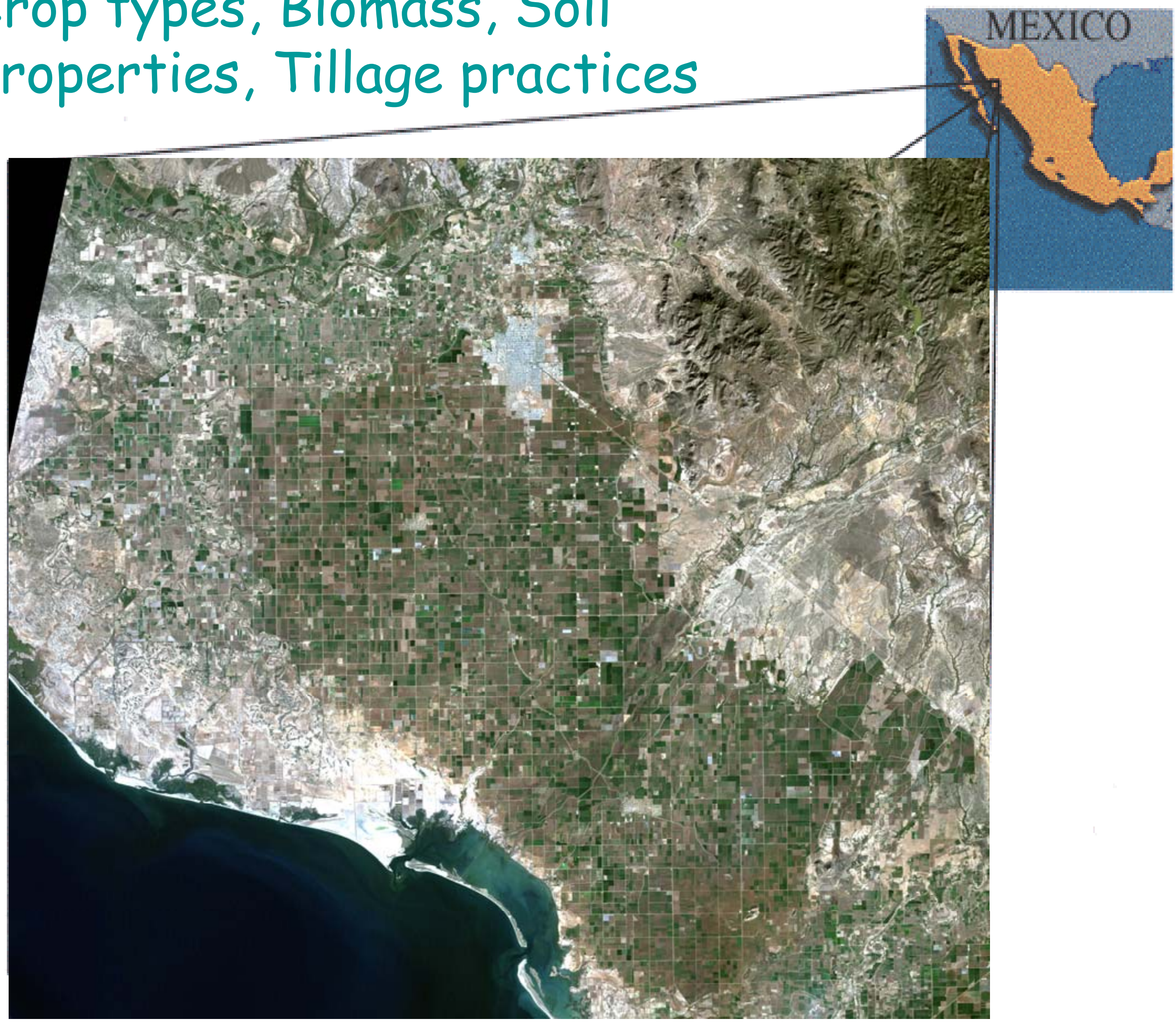
Original Idea: Spatial Models of Land-Air and Land-Water Exchanges = carbon cycle and climate change focus

C, N, H_2O

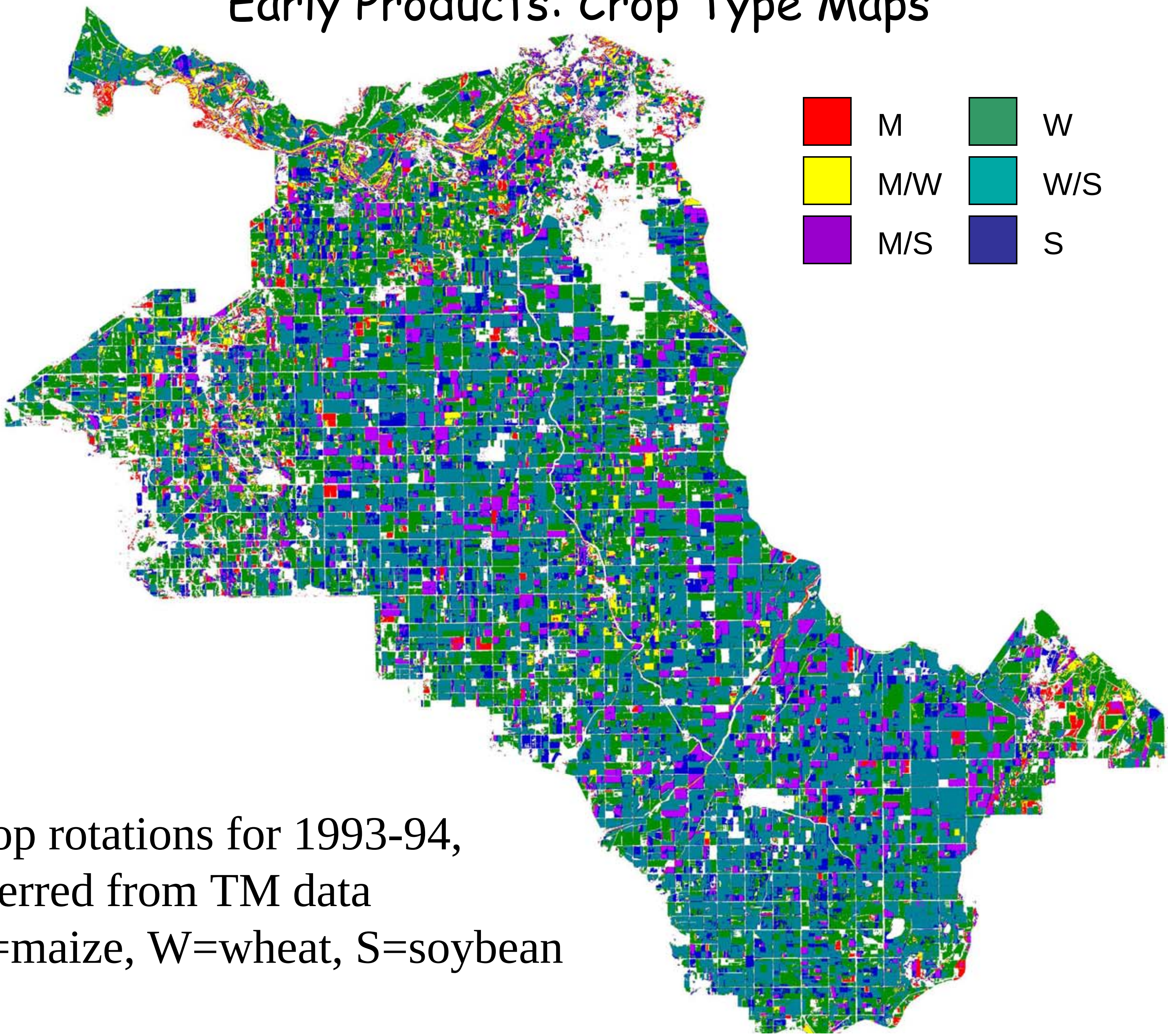


Original Idea: Biogeochemical models require many inputs

Crop types, Biomass, Soil properties, Tillage practices

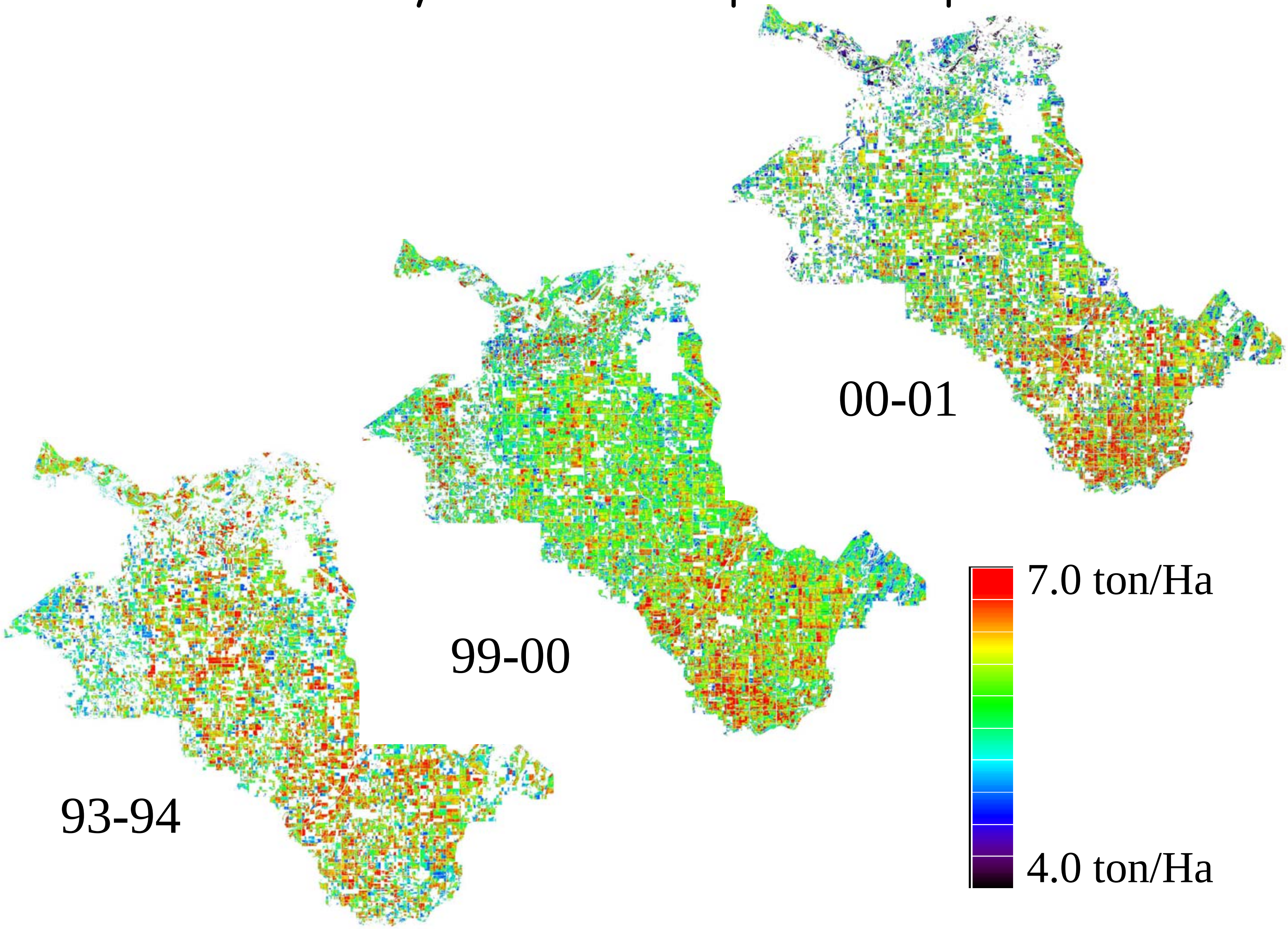


Early Products: Crop Type Maps

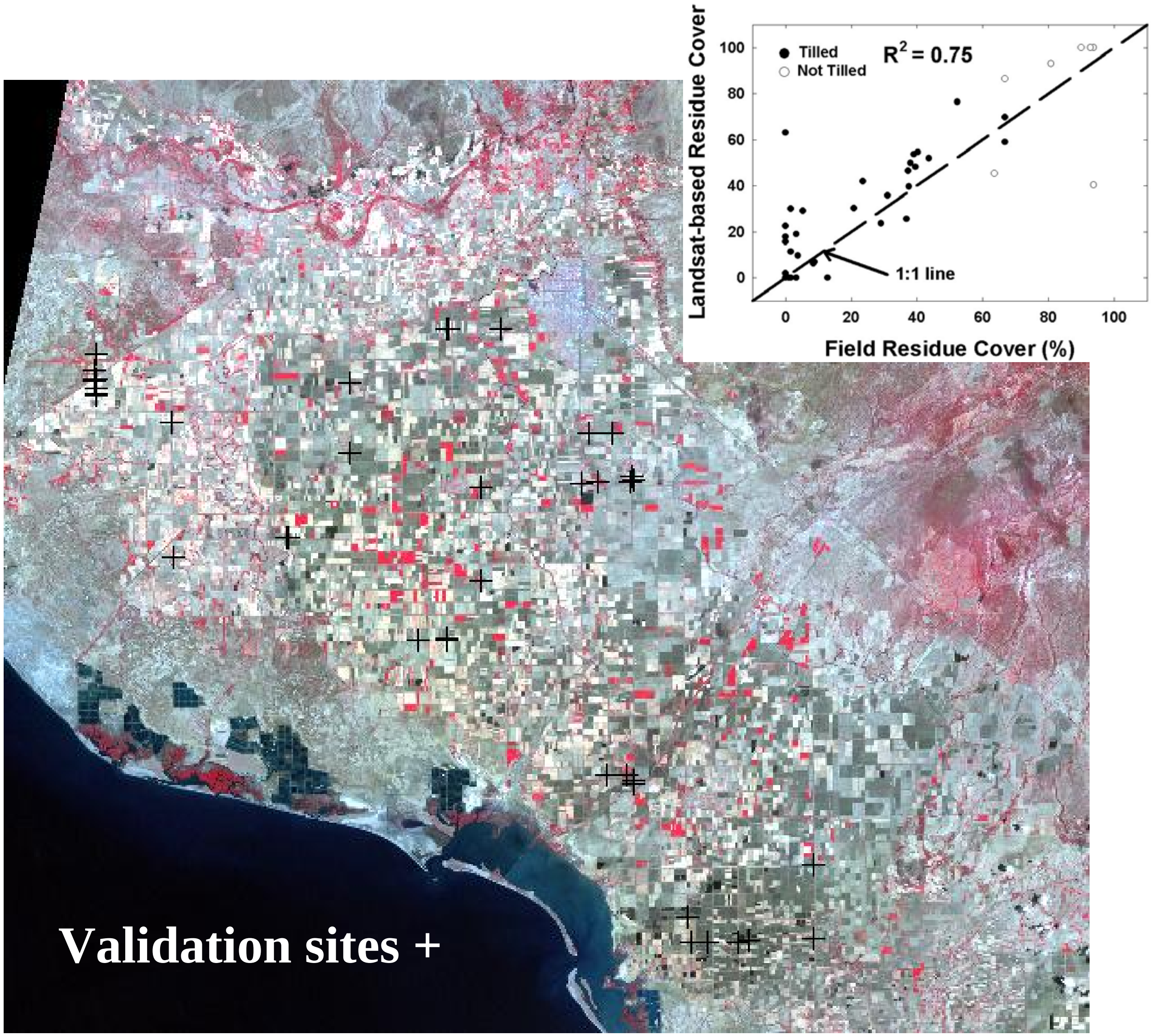


Crop rotations for 1993-94,
Inferred from TM data
M=maize, W=wheat, S=soybean

Early Products: Crop Yield Maps



Early Products: Crop Residue and Tillage Maps



Early Interactions: Gaining new perspectives

Field work

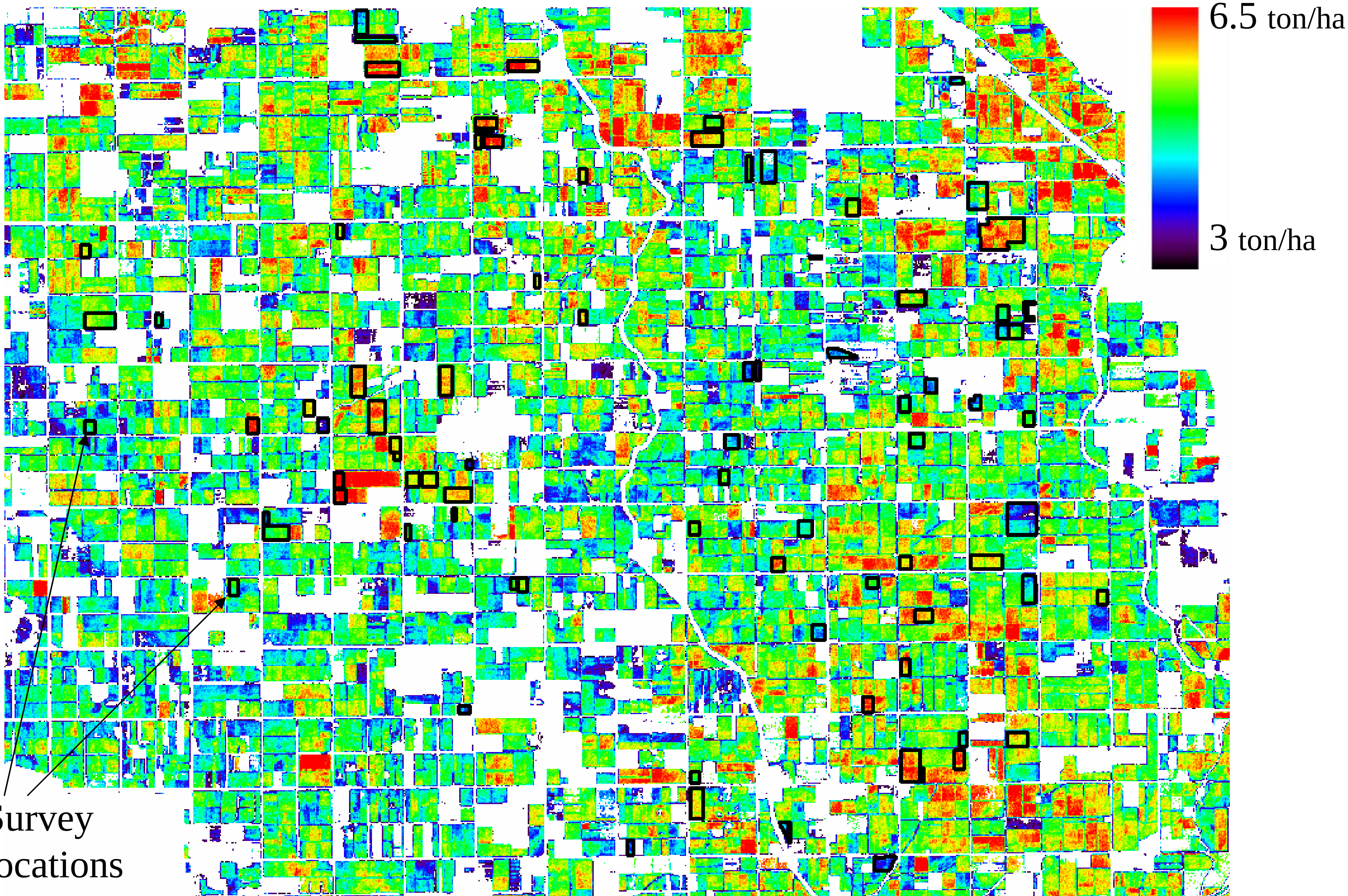
Working at CIMMYT

Early Interactions: Gaining new perspectives

Talking with farmers

Project Meetings

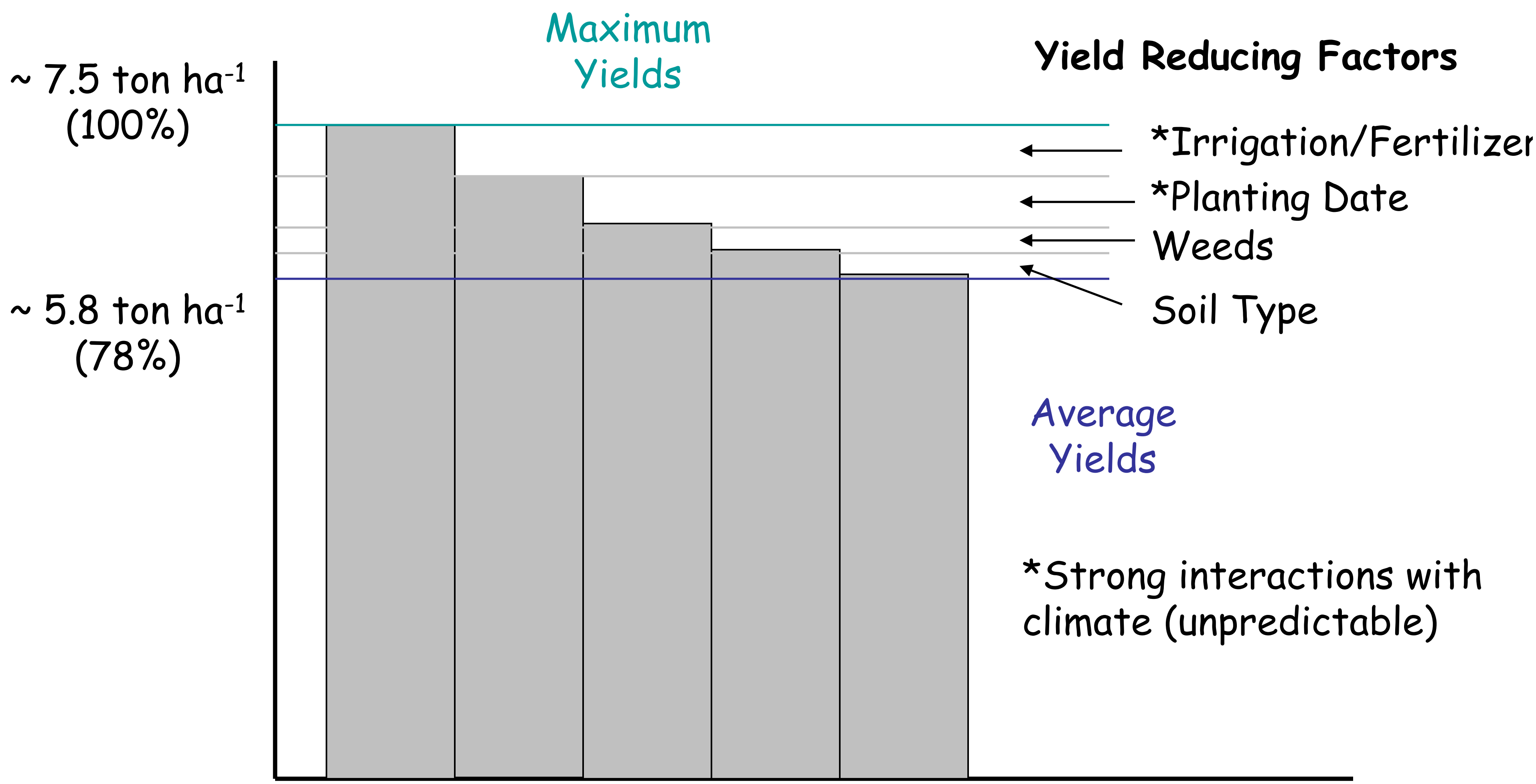
New goals, same tools: Understanding yield variability



Survey locations (n=80)

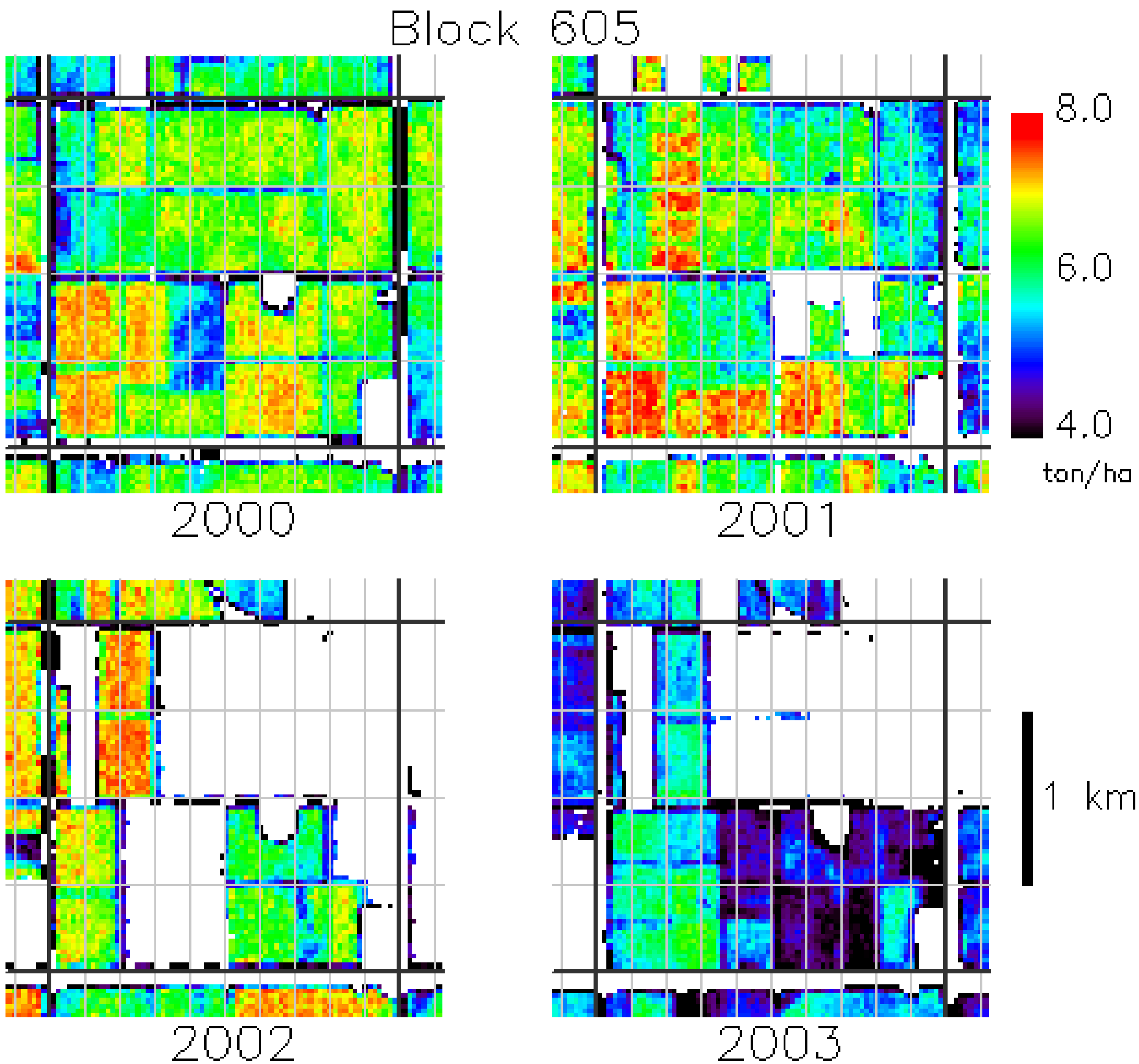
Why do yields vary from <4 to >7 ton/ha?

New goals, same tools: Understanding yield variability



***Height difference between successive bars shows the estimated average yield loss due to sub-optimal conditions for each factor**

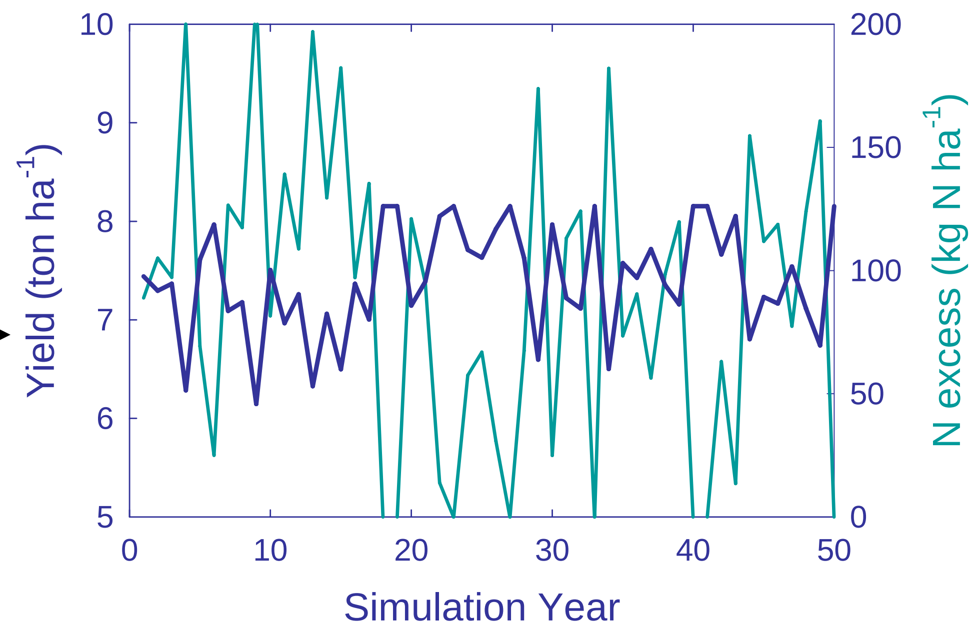
New goals, same tools: Tech transfer to farmers



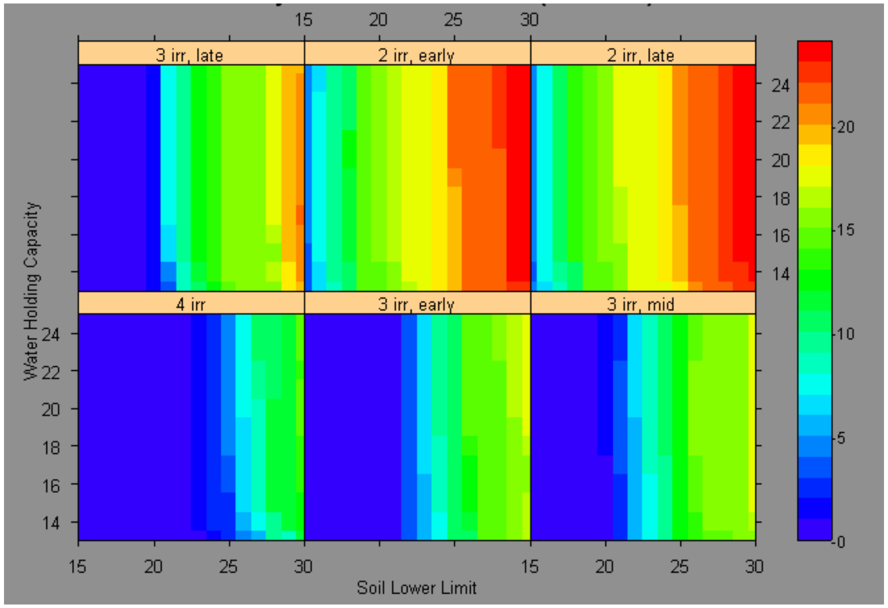
New goals, same tools:

Other side projects:

Understanding N rates using a model of farmer decision making under uncertainty and soil, climate datasets



Exploring irrigation options using crop growth model and soil, climate datasets



Vulnerability analysis (Amy)

Some lessons (sample size = 1)

- Big differences between *ex post* and *ex ante* analyses (uncertainty is important factor in farmer's or institution's behavior)

- For yield or N rate improvements, there were few "easy" recommendations to make, except maybe better weed control. But we now know the tremendous value of reducing uncertainty and have some of the tools to do it (e.g., N diagnostics, remote sensing)

- Some farmers are clearly more progressive and experiment with new ideas and technologies. If and when they work, others likely follow quickly.

Some lessons (sample size = 1)

- Interdisciplinary discussions (incl. farmers) almost always lead to a change in thinking and new ideas

- Everyone thinks at different spatial and temporal scales. This was one of the biggest challenges but also biggest benefits of interdisciplinary research.

- Many years (incl. time in Valley) needed to find real solutions to problems (both for perspective and for data)

- Goals can change quickly, but basic data and model needs are often similar

- Good collaborators are essential

Some challenges (sample size = 1)

For Me:

•Academic incentives are still mainly for doing "cutting edge" disciplinary work, not for relevant or useful work. How to allocate time??

•For Group:

•Long term, "matrix" funding for interdisciplinary work is hard to come by, especially(?) for agriculture

•Balancing the needs to fill missing expertise, allow students to do own thing, and maintain a manageable group size (serendipity vs. design)

•How to measure impact?


Thank You