Greenhouse gas Reduction through Agricultural Carbon Enhancement network: **GRACEnet**

- Evaluate soil C status & change in existing typical and alternative agricultural systems
- Determine net GHG emission (CO₂, CH₄, and N₂O) of existing and alternative agricultural systems
- Determine environmental effects (water, air and soil quality) of new agricultural systems developed to reduce GHG emission and increase soil C storage

Multi-location-coordinated ARS effort
- Core project plan
- Individual scientist project plans
- Peer reviews
GRACEnet

• Experiment Scenarios
  • Business as usual (current management practices)
  • Maximizing C sequestration rate
  • Minimizing net GHG emission including N\textsubscript{2}O and CH\textsubscript{4} emissions
  • Maximizing environmental benefits

• Common sampling guidelines
• Instrumentation development
• Model development
GRACEnet Sampling

Pendleton OR
Year round GHG measurements and CO₂ flux chamber

Dryland Cropping Systems:
GRACEnet Sampling

Morris MN
Dynamic Open Chamber measuring tillage induced CO₂
GRACEnet Sampling

Orono Maine
Chamber monitoring GHG emissions in potatoes
GRACEnet Sampling

Ames IA
Temporal variability of N$_2$O emissions using automated chambers
Annual C balance in corn/soybean fields using eddy covariance
GRACEnet Sampling

Auburn, AL
Effects of elevated atmospheric CO₂ on cropping and pasture systems of the southeast
GRACEnet Sampling

Fort Collins CO
Nitrogen fertilization effects on GHG emissions from irrigated cropping systems
GRACEnet Sampling

Woodward OK
Soil Carbon sequestration assessment of rangeland plots in Southern Plains
GRACEnet Sampling

Lincoln, NE
Soil carbon sequestration with depth under plots of biofuel corn and switchgrass after nine years
GRACE\textit{net} Database

- Strengthen partnership with IT professionals by forming scientist led data teams to improve the structure of the database, but one also suitable across additional science-driven data systems.

- Work with IT professionals to build database entry, data retrieval, and web interface tools.

- Build a data system to allow data providers to describe their measurements, the geography with text and maps, and link to their publications.
GRACEnet

- **Products**
  - National GHG flux & C storage database
  - Summary & synthesis papers for action agencies and policy makers
  - Regional & national guidelines for management practices
  - Development & evaluation of computer models

- **Future**
  - Increased N\textsubscript{2}O emphasis
  - Specialty crops (vegetables, fruits, nuts, horticulture, etc.)
  - Animal systems including increased pasture and range
  - Decision support & mitigation options
  - Domestic and international collaborations
  - Adaptation to future GCC
  - Enhanced database useability

**208 refereed journal articles, books, book chapters, proceedings papers as of 10/08/2010**

http://www.ars.usda.gov/research/GRACEnet
GRACEnet Sampling

Thank you,

Questions?