

Agricultural Research Service Update

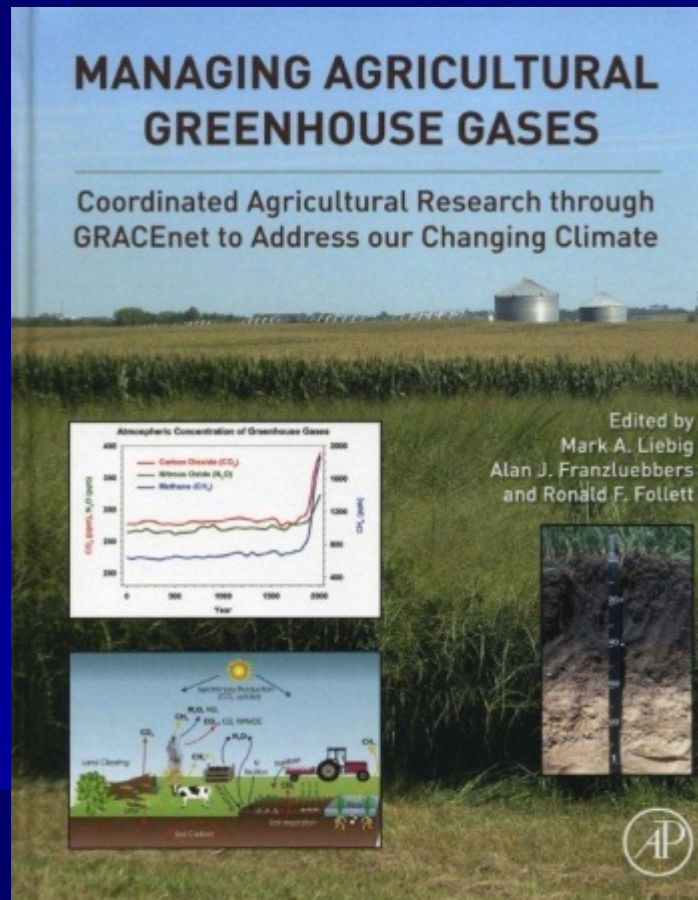
Charles Walthall

National Program Leader

Climate Change, Soils & Air Emissions
Research Program



GRACEnet Book Published



- Mitigation Opportunities & Research
- Agricultural Management & Soil C Dynamics
- Agricultural Management & GHG Flux
- Modeling to Estimate Soil C Dynamics & GHG Flux from Agricultural Production Systems
- Measurement & Monitoring: Improving Estimates of Soil C Dynamics & GHG Flux
- Economic & Policy Considerations Associated with Reducing Net GHG Emissions from Agriculture
- Opportunities for Future Research

Data Management Systems*

■ GRACEnet

**ARS Priority*

- Adding REAP
- Adding Livestock GRACEnet

■ Air Quality Researchers ready**

■ National Agricultural Library Role

- Discussions: Simon Liu, Director NAL
- Data upload & storage
- Data access & exploration tools
- Model storage
- Specialized model interfaces

***Staff retirement impact*

Climate Change and Agriculture: Effects & Adaptation

- Reference document for 8 page NCA agriculture section
- Science literature synthesis update (2009-2012: 1000+ references)
- Foundation for risk analysis, future NCA
- Peer reviewed
- *Community* of scientists created
- 500 + pages
- Print & eBook



Contents

- Overview
 - U.S. Agriculture: *a complex socio-ecological-system (SES)*
 - Changing Climate: *historical data + CMIP3 projections*
 - 150 years stability with short-lived anomalies
 - Increasing pace of change last 50 years
- Effects
 - Climate Change Science & Agriculture
 - Climate Change Effects on U.S. Agricultural Production
- Economics
- Adapting to Climate Change

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Support

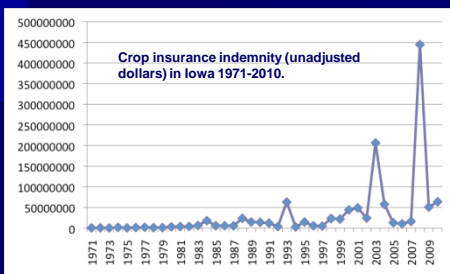
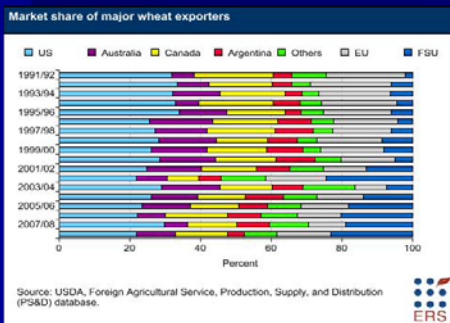
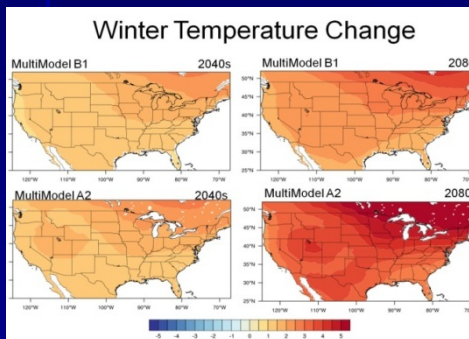
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Value?



- Graphical presentation of historical & projected climate of U.S.
- U.S. agriculture snapshot
- Abiotic & Biotic effects
- Effects on specific crops, livestock, soil, etc.
- Economics - 1st compilation for agriculture
- Adaptation – 1st compilation for agriculture
- Background for NCA 8-pager on Agriculture
- Research needs
- Companion to CAST Report on Agriculture Mitigation Science



Mitigation Science Reference

Livestock GRACEnet Fact Sheets

http://www.ars.usda.gov/research/programs/programs.htm?np_code=212&docid=22546

- Treating Poultry Litter with Aluminum Sulfate
- Poultry Litter Moisture Management to Reduce Ammonia
- Subsurface Injection of Manure to Reduce Ammonia Losses & Odor
- Manure Scraper for Reducing Odor Emissions from Swine Barns
- Dietary Management to Decrease Methane Emissions from Beef Feedlots
- Phase Feeding Crude Protein to Decrease Ammonia Emissions From Finishing Beef Cattle
- DairyGEM: Software for Evaluating Gaseous Emissions from Dairy Farms
- The Integrated Farm System Model: Software for Evaluating the Performance, Environmental Impact and Economics of Farming Systems

ARS...

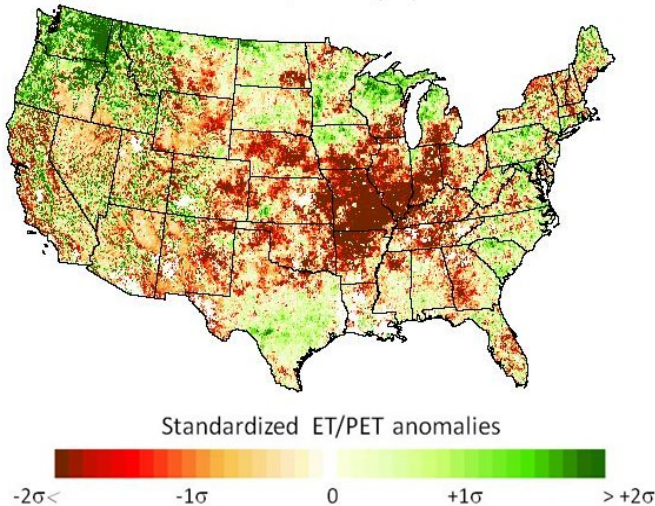
- Global Research Alliance on Greenhouse Gas Reductions from Agriculture (GRA)
 - US leading Cropping Systems Research Group
 - KSU data stewardship role
- Other International collaboration inquiries
- Long Term Agriculture Research Network
 - 10 sites (as of 7/12)
 - GRACEnet planned for each

Looking Ahead

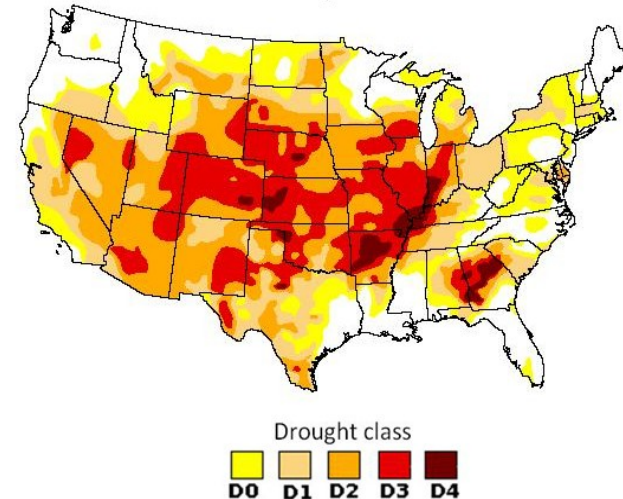
- 2013 Program Retrospective Review
 - Climate Change, Soils, Air Emissions
 - AAQTF member invitation for Review Panel
- Followed by
 - Workshop: priority setting
 - New Action Plan
 - New Project Plans
- Priority for Next 5 Years: *Nitrogen*
- Soil Biology White Paper – Soil Health emphasis
- Natural Resources & Sustainable Agriculture Program Structure Examination

Drought

Evaporative Stress Index
1 month composite ending July 26, 2012



U.S. Drought Monitor
July 24, 2012



Actual-to-potential evapotranspiration via thermal remote sensing & Atmosphere-Land Exchange Inverse (ALEXI) surface energy balance model*

USDA-NOAA-NDMC

*Anderson, M. C., C. R. Hain, B. Wardlow, J. R. Mecikalski, and W. P. Kustas (2011), Evaluation of a drought index based on thermal remote sensing of evapotranspiration over the continental U.S., *J. Climate*, 24, 2025-2044

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