The ARS Long-Term Agroecosystem Research (LTAR) network:

Update & Future Plans

Charles L Walthall PHD
National Program Leader
USDA Agriculture Research Service

18 LTAR LOCATIONS

- Croplands
- Grazinglands

Site Hosts

USDA ARS Laboratories
Archbold Biological Station & University of Florida
Michigan State University
University of Nebraska

Some supplemental funding

LTAR: A *RESEARCH* NETWORK

Purpose: Assess and *enable* *sustainable* working lands

Mission: Enable understanding and forecasting of regional landscape capacities to provide agricultural commodities & ecosystem services under changing conditions.

Bottom Line Questions Driving Data Collection:

Are current *Business-As-Usual* and innovative, *Aspirational* systems sustainable?

What are the consequences of …….?

What evidence (metrics) indicate this?

Trends?

***Vision**: Sustainable agro-ecosystems providing goods and services*

Sustainable Agriculture

Agriculture must transform itself…..

- ***Satisfy human needs for food, feed, and fiber, & contribute to biofuel**
- **Enhance environmental quality & the resources base**
- **Sustain economic viability of producers**
- **Enhance the quality of life for farmers, farm workers, & society as a whole**

-Agricultural Sustainability defined by its goals (NAS, 2010)

Can quantify…..

- Intensify rapidly
- Become climate smart

The Common Experiment

Implemented on all sites

Long-Term Agroecosystem Research

Business as usual

Aspirational

"Ahead of the curve… Something that pulls out all of our best technology… Something that includes all that we have learned about farming on the edge of the future".

Shared Research Strategy

G x E x M

- ***Genetics x Environment x Management***

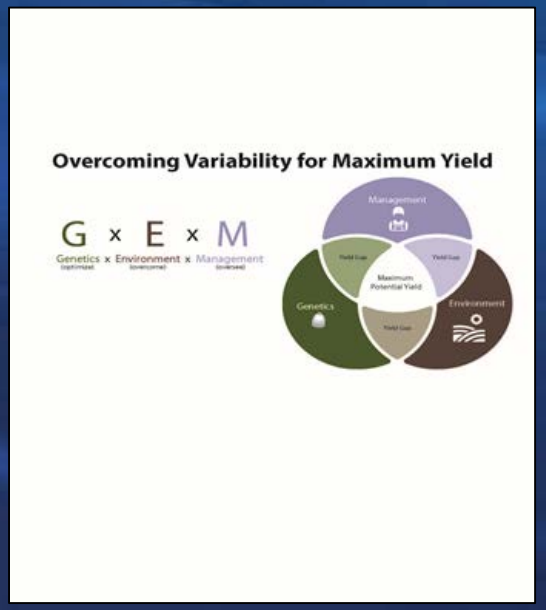
Production = f(GxExM)

  - ***Genetics***: *Variety, breed, or animal haplotype*

    "Potential"
  - ***Environment***: *Stress effects on agriculture: time & space*

    "What cannot be controlled"
  - ***Management***: *Production practices*

    "What can be controlled"



- *Adding **P**ost-processing/**S**ocioeconomic*

Consumer Product = f(GxExM)P

Current LTAR Community Structure

- National Program Leader (& Team)
- Field Leadership Team
- Research Team (Location PIs)
- Technical Working Groups
  - Meteorology
  - Hydrology
  - Soils
  - CO2/Eddy Flux
  - Non-CO2
  - Biology
  - Remote Sensing & Geospatial
  - Data & Knowledge Management
  - Socio-economic ***HELP!!***

Includes Elements of ARS
GRACEnet
REAP
CEAP

Collaborators
60 Colleges & Universities
15 Federal Agencies
12 State Agencies
11 Other Research Networks
25 NGO's
19 Industry Organizations
29 International Organizations

National Ag Library Portal
ARS Scinet & Ceres Big Data
ARS Geospatial Data Portal

Data Harmonization…
NEON
LTER
Other Disciplines….

Interest from…
NRCS
Canada
AgMIP
GeoGLAM
Others….

Yearly Workshop

Project Management Tool, Conference calls, Site visits….

Future: New California LTAR Site

- New ARS NRSAS Water Unit
  - Funded 2017: includes LTAR $$
  - ~7 scientists: data analytics, data management, modelling…..
- Water Issues: regional to local
  - Collaborations with existing efforts including GRAPEX, SNOBAL
  - Strong ties to existing research communities:GxExM
- Specialty crops
- Water Unit Location TBD
- LTAR sites distributed per Upper Mississippi Watershed?
- Workshop

LTAR Future

- Data/observations “backbone” completed: Working groups
- Data pipeline & metadata to Ag Data Commons (NAL)
- Data “harmonization” with collaborators & other networks
- Wider collaborations (“G”, “P”, AgMIP, GEOGLAM, Climate Hubs…)
- Network-wide analysis
  - Regionalization analysis: Representative of systems?
  - Integrated Farm Systems Model (IFSM) + ….
  - Metrics for sustainability
- *Aggressive* Aspirational scenarios
- Network expansion strategy & criterion

Go Global per GRACEnet??

LTAR is unique….

- ***Purpose***: Assess and *enable sustainable* working lands
  - Stakeholder focus: Need dialogue!!
  - Production
  - Economic viability of producers
  - ***Enhanced*** environment & natural resources base
- ***Purpose*** drives what measurements to make
- Historical data is fundamental requirement

NOTHING ABOUT THE LTAR MAKES SENSE EXCEPT IN THE LIGHT OF SUSTAINABILITY

Charles L. Walthall PhD

National Program Leader

Phone: 301-504-4634 (o) 443-968-0660 (c)

Email: Charlie.walthall@ars.usda.gov

Teferi Tsegaye PhD

National Program Leader

Phone: 301-504-4731 (o) 240-917-7359 (c)

Email: Teferi.Tsegaye@ars.usda.gov

http://www.ars.usda.gov/research/programs/programs.htm?np_code=211&docid=22480

https://ltar.nal.usda.gov/

Coming soon: http://www.ltar.org

http://www.ltar.gov