The National Institute for Food and Agriculture's Projects in Climate Change and the USDA/ARS Long-Term Agroecosystem Research Network: A Natural Partnership for Sustainability

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ASA, CSSA, SSSA International Annual Meeting  
Cincinnati, Ohio  
2012 October 21-24

Session #185 National and International Partnerships for Climate Science Applications In Agriculture and Forestry: Bridging Sectoral Requirements
Challenges Facing Agriculture in the 21st Century

- 25% of Earth’s lands are already degraded.

- More than ¾ of the 70% increase in global food production needed by 2050 will have to come from the ‘sustainable intensification’ of existing agricultural lands.

- A global issue, requiring responses internationally and nationally
A model for a science in service of agriculture

Land Grant Universities:
Research, Education, Extension

Agricultural Research Service
Calls for Action

“The requisite systems level understanding [to ensure sustainable agricultural productivity]...can be achieved best—or perhaps only—through long-term research that integrates multiple processes, both biophysical and socioeconomic, across multiple spatial and temporal scales.” Robertson et al. 2008
USDA’s Involvement

- USDA/CSREES: 2006 workshop and white paper that led to Robertson et al. (2008)
- NIFA: LTAP program planning grants, 2009
- ARS: begins to discuss an LTAR network, 2010
- NIFA: Large scale coordinated agricultural projects (CAPs) focused on climate change and biofuels, 2010 calls
- NIFA: Several large scale projects ($5-$20M) including regional CAPs initiated, 2011
- ARS: LTAR network organized 2012, 10 sites selected
Part of the response from NIFA

- 3 Regional Coordinated Agricultural Projects (CAP)
- 115 PI’s across 20 states

Regional
Transdisciplinary
Addressing a Long-term Issue
- Research
- Education
- Extension
ARS LTAR Sites 2012

Criteria

Productivity

Infrastructure Capacity

Data Richness, Availability and Accessibility

Geographic Coverage at Various Scales: HUC-2 watersheds, NEON domains, etc.

Partnerships: with producers, other stakeholders, universities

Institutional Commitment – for 30-50 years of support
Partnerships to Achieve the LTAR Vision: Benefits

– Foster transdisciplinary science to address complex issues
– Engage diverse stakeholders
– Promote integration of research, education, Extension/outreach efforts
– Address spatiotemporal scaling from field to region to nation
– Meet data management and cyberinfrastructure needs
Partnerships to Achieve the LTAR Vision: Challenges

– Remaining responsive in the short term while incorporating the longer view
– Coordinating with relevant partners: NEON, NOAA RISAs, LTERs, Land-grants, other research and education institutions
– Avoiding creating new ‘entities’
– Data management
A Case Study for Collaboration

A NIFA-funded Coordinated Agricultural Project (REACCH)

A newly designated ARS LTAR site
(Cook Agronomy Farm)
$20 million, five-year project funded by the National Institute for Food and Agriculture

Regional Approaches to Climate Change for PNW Agriculture

3 institutions, ARS, 12 academic/research units, >60 scientists, 20 students and postdocs

Research – Extension – Education
Transdisciplinary (biological, socio-economic)
Geographically Extensive
REACCH
REACCH aims to:

– ensure the long-term viability of cereal-based farming in the inland Pacific Northwest amid a changing climate (adaptation)

– identify farming practices that can help reduce greenhouse gas emissions (mitigation)
Cook Agronomy Farm

- A Long-term, field-scale, direct-seed and precision agricultural systems research program
- Launched in 1998 by ARS and WSU scientists
- Research, Education and Extension/Outreach
- ARS, WSU and U of I Researchers
  - Many disciplines – biophysical, socioeconomic
- Advisory team: WA and ID growers, Agribusiness
Cook Agronomy Farm

• Aims to reduce risks, conserve soil and other resources, increase profits and agroecosystem function

• Includes study of within-field processes for sustainable precision agroeceology

• Serves producers on 3.6 acres in ID and WA
Cook and REACCH Partnership

• Data management
• Integrating across scales from field to region
• Sharing physical infrastructure
• Education and Extension
• Transdisciplinary integration
• Engaging with other projects and entities in the region
• Forging a common vision for regionally integrated efforts for agricultural sustainability
Cook and REACCH Partnership

Research: Scaling up, from field to region
Cook and REACCH Partnership

Education and Extension

Graduate Retreat

Teacher Workshops

Elementary workshops

Summer interns
CAAF and REACCH Partnership

Data management

- REACCH data policy, portal for storage, discovery, synthesis across the project
- As an LTAR, CAF to comply with LTAR data management policies and cyberinfrastructure
- Both require interoperability, metadata standards, accessibility, legacy data migration
Beyond Cook and REACCH
A Regional Long-term Effort

Strengthening and Augmenting Partners

• The land-grant universities: OSU, UI, WSU
• Federal entities (USDAFS, NIFA, NASA, NSF, NOAA, DOI others) and funded projects
• ARS units: Pendleton, Wapato, Corvallis, NW Watershed Res. Center, Aberdeen, Kimberly, Dubois
• NEON Domain (16, Wind River Experimental Forest)
• Pacific Northwest Climate Science Center
• Great Northern Landscape Conservation Cooperative (DOI)
• National Laboratories (INL, PNNL)
• Identifying shared interests, commitments, resources
IGERT Projects
WSU-NSPIRE
UI - Ecological Resilience

Pacific NW Regional Climate Science Center
Great Northern LCC
Oregon Climate Change Research Institute (OCCRI)
Climate Impacts Research Consortium (CIRC)

A Pacific Northwest LTAR

Site Specific Climate Friendly Farming
WSU

- PINEMAP
- SustainableCorn.org
- MAS Wheat (Davis)

ARS GRACEnet
ARS LTAR Site (Cook Farm)

Kellogg Biological Station

UI - Northwest Knowledge Network

Idaho EPSCoR

OSU
Oregon State University

UW
Climate Impacts Group (CIG)

WSU

BioEarth

REACCH

USDA
Agricultural Research Service

University of Idaho
Ways Forward in the PNW

– Goals: identify synergies, common needs, joint activities, sustainable leadership structure, overarching identities
– First step: convene representatives for NIFA/NSF/NASA sponsored projects, universities, other federal entities, ARS/LTAR units in the PNW.
Ways Forward, National

- Initiate a similar process in the regions served by ARS LTARs, Large-scale NIFA projects, Land-grants, other partners
- Establish a community of practice for these regional partnerships
- Establish a network for coordinating such efforts
Thank you for your attention!

Photo: David Barton
Partnerships to Achieve the LTAR Vision: Benefits, cont.

- Address processes that occur over longer term (decades)
- Address the broader societal benefits of modern agriculture (e.g., bio-energy production, carbon sequestration, water quality and improved water quality & water-use efficiency, wildlife habitat).
Cook and REACCH Partnership

Sharing physical infrastructure

Long-Term Experiments at Pendleton Agricultural Research Center

Palouse Research, Extension and Education Center

Lind Dryland Research Station
Partnerships to Achieve the LTAR Vision

Federally Funded Projects at Land Grants

- Three Missions:
  - Research
  - Education
  - Extension
- Disciplinary Breadth
  - Biophysical
  - Social
  - Economic
  - Humanities
  - The Arts

ARS LTARs

- Core funding
- Long-term commitment
- Specialized expertise
- Research focus
- Legacy data

Other Partners

- NEON, LTER, DOI LCCs,
- Regional Climate Centers,
- NOAA RISAs

- Long-term
- Infrastructures
- Data management needs
- Geographic extent at different scales
- Institutional commitments
- Legacy data
ARS LTAR Evaluation Criteria

• Productivity
• Infrastructure Capacity
• Data Richness, Availability and Accessibility
• Geographic Coverage at Various Scales: HUC-2 watersheds, NEON domains, etc.
• Partnerships: with producers, other stakeholders, universities
• Institutional Commitment – for 30-50 years of support
More Detail on preceding