

USDA Regional Climate Hubs and the Long-Term Agro-ecosystem Research (LTAR) network

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Complementary Networks

- Long-Term Agro-ecosystem Research (LTAR) network formed with 10 sites in late 2012
 - 8 more sites added in early 2014
- USDA Regional Climate Hubs announced in February 2014
- Addressing agricultural lands and climate change
 - Enhanced decision-making
 - Reduced enterprise risk
 - Increased efficiency of production



Long-Term Agro-ecosystem Research

Long-Term Agro-ecosystem Research Sites and Farm Resource Regions



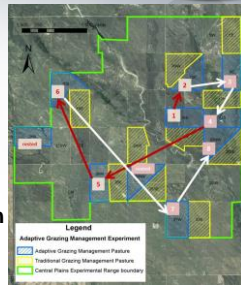
LTAR Network Focus

- Sustain or enhance productivity, profitability and ecosystem services in agro-ecosystems and agricultural landscapes
 - Need to increase food availability
 - Neutral to positive environmental effects



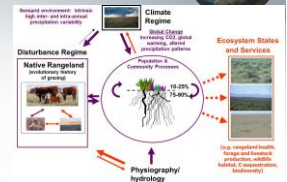
LTAR Network-wide Experiments

- Replicated experimental designs at each site evaluating “business as usual” and “aspirational agriculture” land management strategies
 - “Aspirational agriculture” would address sustainable intensification of production and ecosystem services



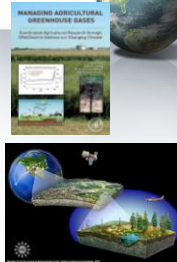
Common Core Measurements

- Productivity; climatic conditions; fluxes of carbon, water and energy; greenhouse gases; wind erosion; hydrology; phenology
 - Cross-site comparisons
 - Meta-analyses with other network data (National Ecological Observatory Network, NEON; Long-Term Ecological Research, LTER)
 - Model validations, simulations, and projections

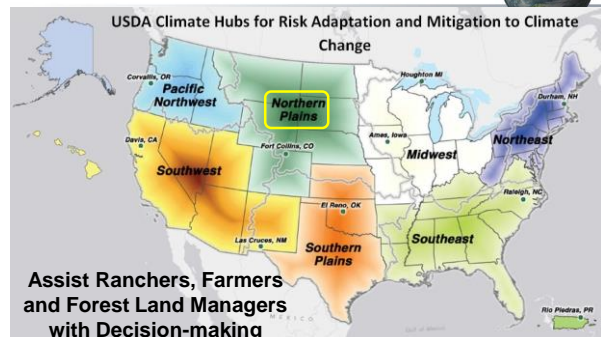


Experimentation and Observatory

- Sensors and sensor networks
 - Eddy covariance systems
 - Greenhouse gases (GRACEnet)
 - Wind erosion network
- Remote sensing
 - NASA and Jet Propulsion Lab
 - NEON airborne platform support
- Modeling
- Collected ground data and availability
 - Data Management Specialists and Big Data



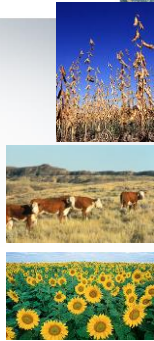
USDA Regional Climate Hubs



Assist Ranchers, Farmers and Forest Land Managers with Decision-making

Key Thrust

- The Hubs will deliver science-based knowledge and practical information to **farmers, ranchers, and forest landowners** that will help them to adapt to weather variability by **coordinating** with local and regional partners in Federal and state agencies, NGO's, private companies, and Tribes.

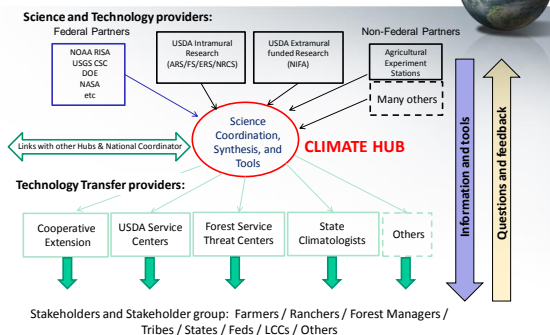


Key Approach

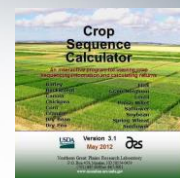
- Conduct the transfer of information, tools and management practices to **agricultural producers** to enhance **decision making** with weather variability for reduction of enterprise risk and increased resilience of working lands.



Conceptual Framework for a USDA Regional Hub



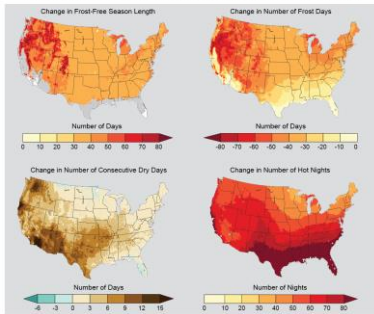
Regional Climate Hubs Will Provide: Technical Support and Decision Tools



Regional Climate Hubs Will Provide:

Assessments/Forecasts

Projected Changes in Key Climate Variables Affecting Agricultural Productivity

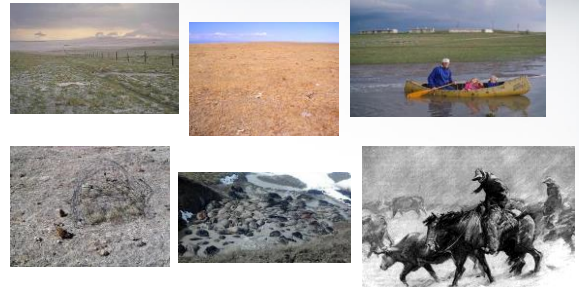


Long-range projections provided, but there is a clear need for reliable weather forecasting on time scales relevant for agricultural decision making (3-6 months to several years).

Third National Climate Assessment

Recent/Projected Climatic Changes

Third National Climate Assessment: Droughts, Deluges and Extreme Events



Regional Climate Hubs Will Provide: Outreach/Education

100 years
UNIVERSITY of WYOMING
EXTENSION

Celebrating
100 years
EXTENDING KNOWLEDGE,
CHANGING LIVES.

iGrow™
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NDSU EXTENSION
SERVICE

MONTANA
STATE UNIVERSITY
EXTENSION
across generations across Montana.

Conduct
retrospective/prospective
efforts to garner feedback from
agricultural producers.



Adaptive Management

- Enterprise flexibility in
 - stocking rates, time/season of grazing, type/species of animal and deferment/rest
 - Crop species, varieties, rotations, cover crops, more "crop per drop"
- Flexible stocking with high quality precipitation forecasts could **double economic returns** for ranchers

- Torell et al. 2010 Rangeland Ecology and Management 63:415-425.



Questions?

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