The Secretary of the US Department of Agriculture announced the 10 Climate Hubs in February 2014. The mission of the Climate Hubs is to develop and deliver science-based, region-specific information and technology with USDA agencies and partners:

- to agricultural and natural resource managers
- that enable climate-informed decision-making,
- and provide access to assistance in implementing those decisions.

OBSERVED WEATHER VARIABILITY AND CHANGING CLIMATE

The Northern Plains has experienced increased weather variability and climatic changes throughout the 20th and early 21st centuries. The following are examples of observed changes, which pose risks and opportunities to agricultural production:

- Increased atmospheric carbon dioxide (CO₂) concentration
- Increased length of frost-free season
- Increased frequency of extreme events (e.g., droughts, heat waves, downpours)
- Increased nighttime temperatures
- Northward shift in plant hardiness zones
- Earlier and faster snowmelt-driven runoff, resulting in reduced summer streamflows

United States Department of Agriculture
Northern Plains Climate Hub
Agricultural producers are dealing with increased risks associated with weather variability and changing climate.

**VULNERABILITIES**

**Livestock:**
- Reductions in livestock performance due to higher temperatures and greater pest abundance on livestock
- Increases in non-native invasive plants which alter pasture or rangeland, community composition, nutrient cycling, and fire risk

**Croplands:**
- Operational challenges for reservoir storage to provide irrigation water when needed for crop growth
- Higher nighttime temperatures during critical grain filling periods, which can reduce yields

**Forests:**
- Longer, hotter growing seasons increase wildfire risk
- Increases in pests, water stress, and invasive species enhance susceptibility to disease and mortality

**ADAPTATION**

Adaptation is a process of preparing for and responding to changes in climate by adjusting management in ways that harness benefits or reduce anticipated effects.

**ADAPTATION STRATEGIES**

The USDA has identified a number of practices that land managers can use to adapt to or mitigate the effects of increased weather variability and a changing climate to make their operations more resilient.

**Livestock:**
- Adaptive grazing management
- Grass-banking
- Livestock operation flexibility

**Croplands:**
- Plant more water-efficient varieties
- Precision planting, fertilization, and irrigation
- Protect and enhance soil health

**Forests:**
- Plant diverse, pest tolerant and drought resistant species
- Prescribed fire and thinning of coniferous forests
- Proactive pruning/maintenance of urban trees to reduce risk from extreme events

**MITIGATION**

Mitigation activities reduces the amount of greenhouse gases in the atmosphere by capturing and storing them (e.g., in soil) or reducing emissions.

**MITIGATION STRATEGIES**

The USDA has identified 10 Building Blocks for Climate Smart Agriculture to reduce greenhouse gases in the atmosphere. The 10 incentive-based Building Blocks are:

- Soil Health
- Conservation of Sensitive Lands
- Livestock Partnerships
- Promotion of Wood Products
- Stewardship of Federal Forests
- Grazing and Pasture Lands
- Energy Generation and Efficiency
- Private Forest Growth and Retention
- Nitrogen Stewardship
- Urban Forests

To learn more visit:  http://goo.gl/Kqtw5V

**VULNERABILITY ADAPTATION MITIGATION**

1. Download and install the free Aurasma app from Play Store or iTunes Store to your phone or tablet.
2. Click on Aurasma icon.
3. Type “UWAG” in the Search box at the top of the screen. Click on the UWAG channel, then choose Follow.
4. Click on the open square symbol at the bottom of the screen.

Point your phone or tablet at the image that has the Aura icon and watch the magic! Double-clicking enlarges the video to full screen and enables watching the video away from the Aura image.

To learn more visit:  http://goo.gl/0Xg5ej