Helpful USDA NASS Links

USDA NASS Crop Progress and Condition Reports - Kentucky:
https://www.nass.usda.gov/Statistics_by_State/Kentucky/Publications/Crop_Progress_&_Condition/index.php

USDA NASS - VegScape:
https://nassgeodata.gmu.edu/VegScape/

- VegScape shows 5 different vegetation indices at weekly, biweekly and sometimes daily coverage with the data going back to 2000. VegScape can help alert users to outlier events such as drought, floods, late plantings, disasters, etc. There is a new operational NASA mission called SMAP (Soil Moisture Active Passive) and NASS is looking at ways to incorporate that mission into VegScape since it measures soil moisture.
- U.S., State, District and County level

2013 Farm and Ranch Irrigation Survey:
http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Farm_and_Ranch_Irrigation_Survey/

1. What is the 2013 Farm and Ranch Irrigation Survey
- The 2013 Farm and Ranch Irrigation Survey (FRIS) is a supplement to the 2012 Census of Agriculture. This survey provides the only comprehensive information on irrigation activities and water use across American farms, ranches, and horticultural operations. In responding to the survey, producers provide information on water sources and amount of water used, acres irrigated by type of system, irrigation and yield by crop, and system investments and energy costs.

2. How is the Farm and Ranch Irrigation Survey conducted?
- Just as with the Census of Agriculture, the Farm and Ranch Irrigation Survey is conducted once every five years. NASS will survey a sample of all farmers who indicated on their Census of Agriculture form that they used irrigation on their operation. For the 2013 Farm and Ranch Irrigation Survey, approximately 35,000 producers across the United States participated.

USDA-ARS' Evaporative Stress Index:
http://hrsl.arsusda.gov/drought/

- The Evaporative Stress Index (ESI) describes temporal anomalies in evapotranspiration (ET), highlighting areas with anomalously high or low rates of water use across the land surface. Here, ET is retrieved via energy balance using remotely sensed land-surface temperature (LST) time-change signals. LST is a fast- response variable, providing proxy information regarding rapidly evolving surface soil moisture and crop stress conditions at relatively high spatial resolution. The ESI also demonstrates capability for capturing early signals of "flash drought", brought on by extended periods of hot, dry and windy conditions leading to rapid soil moisture depletion.
- ESI values quantify standardized anomalies (σ values) in the ratio of clear-sky actual-to-potential ET (fPET), derived using thermal infrared (TIR) satellite imagery from geostationary

platforms. To capture a range in timescales, fPET composites are developed for 1, 2 and 3 month moving windows, advancing at 7-day intervals. Standardized anomalies are then computed with respect to normal conditions (mean and standard deviation) for each compositing interval assessed over a period of record from 2000-2015.

Vegetation Drought Response Index - VegDri:
http://vegdri.unl.edu/

- The National Drought Mitigation Center (NDMC) produces VegDRI in collaboration with the US Geological Survey's (USGS) Center for Earth Resources Observation and Science (EROS), and the High Plains Regional Climate Center (HPRCC). Main researchers working on VegDRI are Dr. Brian Wardlow, with the Center for Advanced Land Management Information Technologies (CALMIT), and Dr. Tsegaye Tadesse at the NDMC, and Jesslyn Brown with the USGS. NDMC and CALMIT are both based in the School of Natural Resources at the University of Nebraska-Lincoln. VegDRI was developed with sponsorship from the US Geological Survey (USGS), the US Department of Agriculture's (USDA) Risk Management Agency (RMA) and from NASA. Continued operational production of VegDRI is supported by the USGS.
- VegDRI maps are produced every two weeks and provide regional to sub-county scale information about drought's effects on vegetation. In 2006, VegDRI covered seven states in the Northern Great Plains (CO, KS, MT, NE, ND, SD, and WY). It expanded across eight more states in 2007 to cover the rest of the Great Plains (NM, OK, MO, and TX) and parts of the Upper Midwest (IA, IL, MN, and WI). VegDRI expanded to include the western U.S. in 2008 (WA, ID, OR, UT, CA, AZ, NV). In May 2009 VegDRI began depicting the eastern states as well, covering the entire conterminous 48-state area.
- The VegDRI calculations integrate satellite-based observations of vegetation conditions, climate data, and other biophysical information such as land cover/land use type, soil characteristics, and ecological setting. The VegDRI maps that are produced deliver continuous geographic coverage over large areas, and have inherently finer spatial detail (1-km2 resolution) than other commonly available drought indicators such as the U.S. Drought Monitor.

Drought Risk Atlas:
http://droughtatlas.unl.edu/MapViewer.aspx

-About the Drought Risk Atlas-

- The National Drought Mitigation Center Drought Atlas project is intended to provide a wide range of decision makers with historical drought information and a web-based tool to visualize and assess their risk to drought. Using a station-based approach, decision makers are allowed to find the station closest to their area of interest as well as a cluster of stations that statistically has shown similar precipitation attributes. The stations with the longest period of record, a minimum of 40 years, with the most complete record were used to compute both the climatological and drought information to provide users with information from the best station data available.
- Why a drought atlas? Every time there is a drought event, the question is asked, “How does this drought compare……”, and the comparisons are usually to the last drought event, the drought of record for an area or a significant/historical drought that was remembered even outside of the area impacted. This information, up to this point, has not been readily available at individual

stations, and more often than not has only been available for climate divisions. Information contained in the NDMC Drought Risk Atlas will answer all of these questions as well as provide a user-friendly portal to access these data.

- The drought atlas project also realizes that not every drought index is ideal for every location. By providing several different indices with multiple time steps, the Drought Risk Atlas gives users a vast menu of options to study and investigate drought for their region to find which indicators and time steps are ideal for their location. It is hoped that the NDMC Drought Risk Atlas will be a valuable tool to help mitigate and lessen the impacts related to drought.

-Drought Risk Atlas Partners-

- This work is funded under a grant from the Sectoral Applications Research Program (SARP) of the NOAA-Climate Program Office.

National Drought Mitigation Center-Groundwater and soil moisture assimilations:
http://drought.unl.edu/MonitoringTools/NASAGRACEDataAssimilation.aspx

- Scientists at NASA's Goddard Space Flight Center generate groundwater and soil moisture drought indicators each week. They are based on terrestrial water storage observations derived from GRACE satellite data and integrated with other observations, using a sophisticated numerical model of land surface water and energy processes. The drought indicators describe current wet or dry conditions, expressed as a percentile showing the probability of occurrence within the period of record from 1948 to the present, with lower values (warm colors) meaning dryer than normal, and higher values (blues) meaning wetter than normal. These are provided as both images and binary data files.

-Non-Technical Description-

- The maps are based on data from NASA's Gravity Recovery and Climate Experiment (GRACE) satellites, which detect small changes in the Earth's gravity field caused by the redistribution of water on and beneath the land surface. The paired satellites travel about 137 miles (220 km) apart and record small changes in the distance separating them as they encounter variations in the Earth's gravitational field.
- To make the maps, scientists use a sophisticated computer model that combines measurements of water storage from GRACE with a long-term meteorological dataset to generate a continuous record of soil moisture and groundwater that stretches back to 1948. The meteorological data includes precipitation, temperature, solar radiation and other ground- and space-based measurements.
- The maps are meant to depict drought associated with climatic variability, as opposed to depletion of aquifers due to groundwater withdrawals that exceed recharge. There are several aquifers in the U.S. that have been depleted in that way over the past century, such as the southern half of the High Plains aquifer in the central U.S. If the groundwater drought indicator map accounted for human-induced depletion, such regions would be red all the time, which would not be useful for evaluating current wetness conditions relative to previous conditions. On time scales of weeks to ten years, we expect that our maps will be reasonably well correlated with measured water table variations over spatial scales of 25 km (16 miles) or more. However, users should not assume a direct correspondence between these groundwater percentiles and measured groundwater levels over multiple decades.

- The color-coded maps show how much water is stored now as a probability of occurrence in the record from 1948 to the present.

National Weather Service Climate Prediction Center:
http://www.cpc.ncep.noaa.gov/

The Palmer Drought Severity Index (PDSI):
http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml

- Current Palmer Drought Severity Index (by Climate Divisions)
  http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif
- Current Palmer Drought Severity Index Percentiles (by Climate Divisions)
  http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/rpd07dcd.gif
- Current Palmer Drought Severity Index Percentiles (by State)
  http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/rpd07drs.gif
- Additional Precipitation Needed to Bring Palmer Drought Index to -0.5
  http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif
- Current Crop Moisture Index (by Climate Division)
  http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/cmi.gif