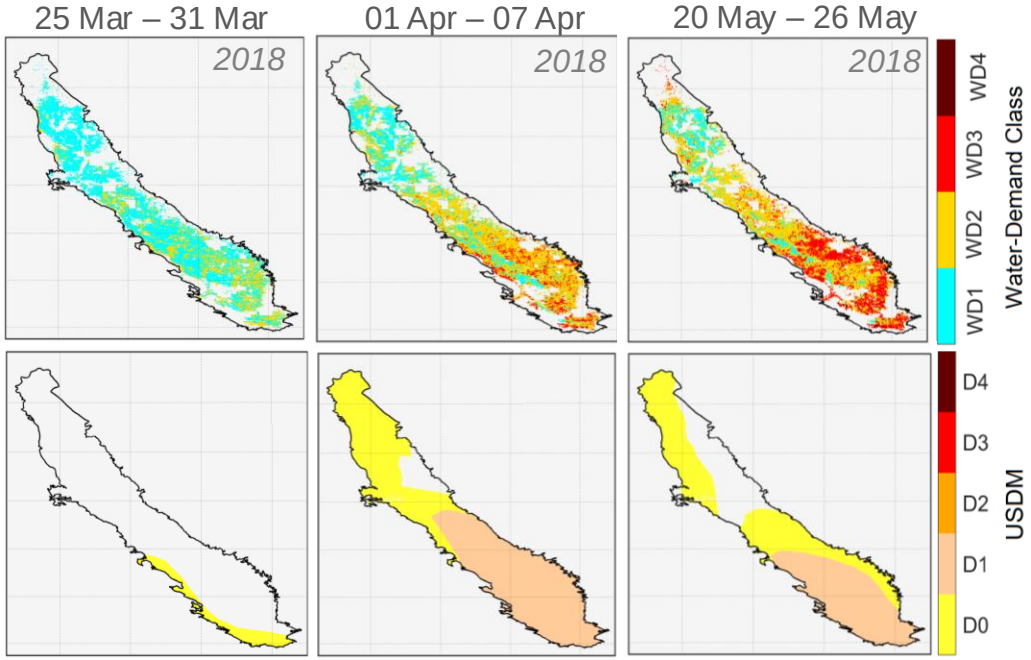
Water-Demand Mapping in Agricultural Regions with SMAP Soil Moisture for Improved Irrigation Decisions

Problem: To develop a straightforward, satellite data-driven approach as an alternative to data intensive and complex methods currently used, for better and timely identification of farm-scale crop water-stressed areas, thereby enhancing irrigation management and water-use efficiency.



WD Class: WD1(**Low**), WD2 (**Moderate**), WD3 (**High**), WD4 (**Extreme**)

US drought monitoring *:* D0 (**Abnormally Dry**), D1 (**Moderate Drought**)

Finding:

1. Integrating SMA-Sentinel soil moisture with NDVI and GDD has the potential to identify agricultural regions (≤ 1 km) with near-real time irrigation Water-Demand.
2. By providing high-resolution insights for irrigation decisions, Water-Demand mapping outperforms existing drought indices-based on complex data-intensive modeling and climatology information.
3. Crop yield and seasonal groundwater level change are found to be negatively correlate with Water-Demand Index.

Impact: Study provides a tool to generate weekly water-demand maps of high-resolution using satellite data, that identify water-stressed regions/fields in a timely manner and prioritize irrigation and optimal water allocation strategies. This can help enhancing agricultural water use efficiency.

Singh, G., and Das, N.N., 2022. A data-driven approach using the remotely sensed soil moisture product to identify water-demand in agricultural regions. *Science of The Total Environment*.