planet.

PLANETARY VARIABLES:
Soil Water Content

Soil Water Content measurements in Tanzania • June 30 2022

The hydrological systems of our planet are as complex as they are vital to life on Earth. Monitoring this complexity is not easy, and acting effectively in response to shifting water resources is impossible without scalable, accurate, and consistent sources of data. Planet's Soil Water Content is a feed of high-resolution, globally available measurements of the water content of the soil, unhindered by clouds. Combining observations from a range of satellite constellations, Soil Water Content delivers accurate, continuous, and scientifically rigorous data, providing vital intelligence about our dynamic water systems.

Uninterrupted Coverage

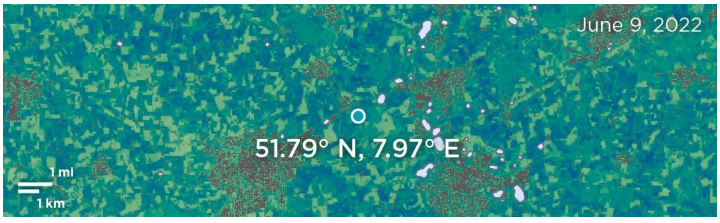
Receive near-real-time data unhindered by clouds or darkness for unmatched granularity of coverage and frequency.

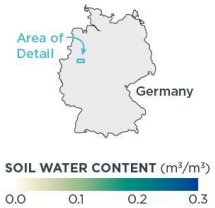
Deep Archive

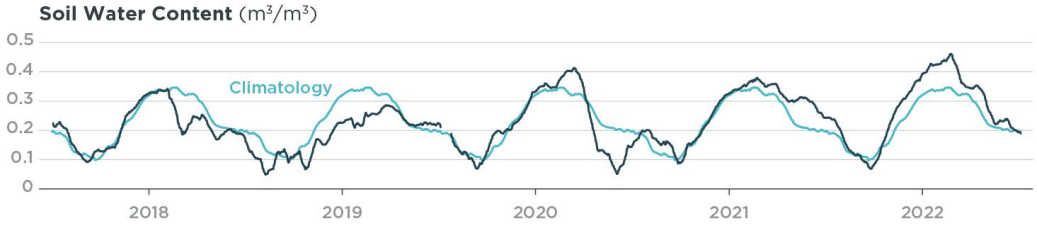
Draw from a robust historical archive of data dating from 2002 build historical baselines and more effective models

High Accuracy

Match the accuracy of ground sensors without the burdens of physical maintenance.







Measurements of Soil Water Content near Ahlen, in North Rhine-Westphalia, Germany. The image above represents the varying water stored in the soil from a single day. Each pixel represents the water content of the top 5 cm in a 100 x 100 meter area. Below, the measurements of the Soil Water Content of a single point are plotted over 5 years with the baseline climatology, showing how moisture levels compare to the expected average for the area.

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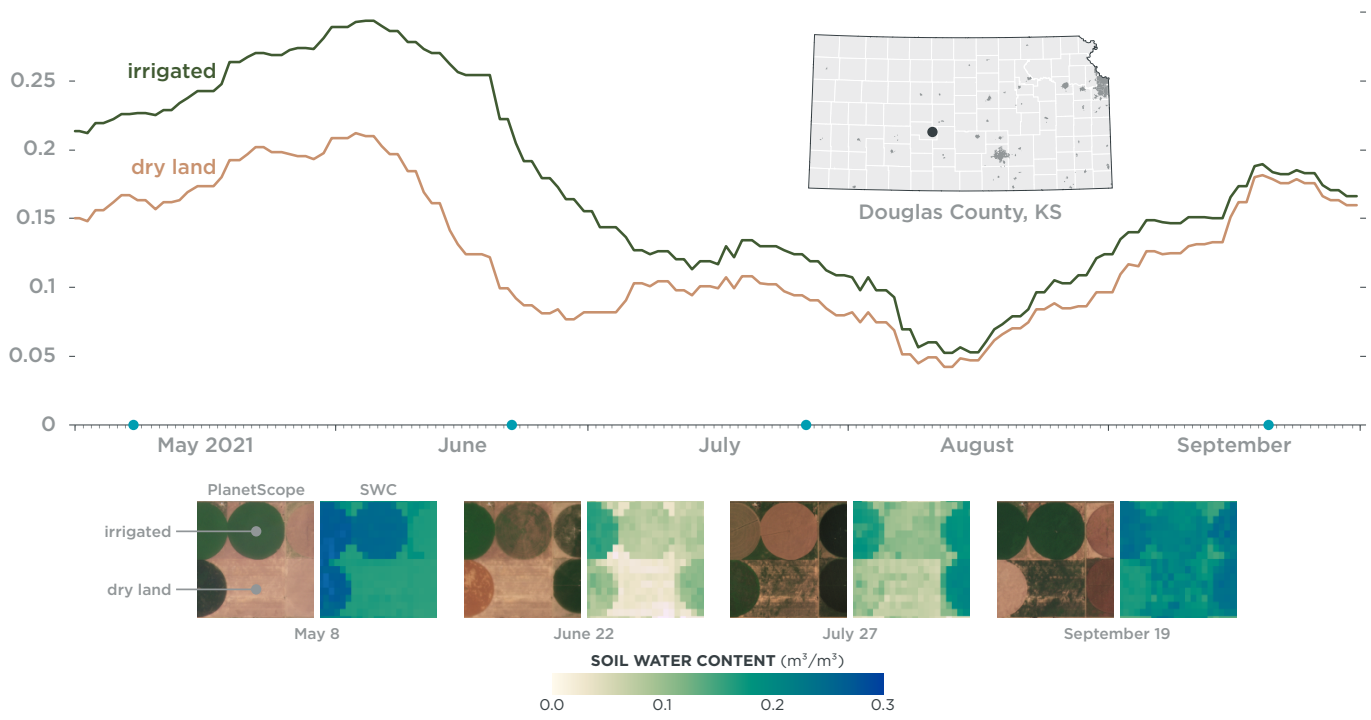
HOW IT WORKS

Soil Water Content data is based on data from satellite sensors that measure passive microwave radiation Microwaves are highly sensitive to the water stored in the top layer of soils, so a measurement of the volume of fresh water stored in the soil can be accurately derived from space-borne sensors. By combining overlapping observations from multiple public satellite constellations, Planet creates downscaled observations. Initial observations represent several kilometers of the earth surface, but Planet Soil Water Content data is delivered at 1 km and 100 m spatial resolutions. The 100 m product also includes optical data from the Sentinel-2 constellation, where the shortwave infrared and near-infrared bands provide data that further downscales the resolution of the imagery.

USE CASES ACROSS INDUSTRIES

Agriculture

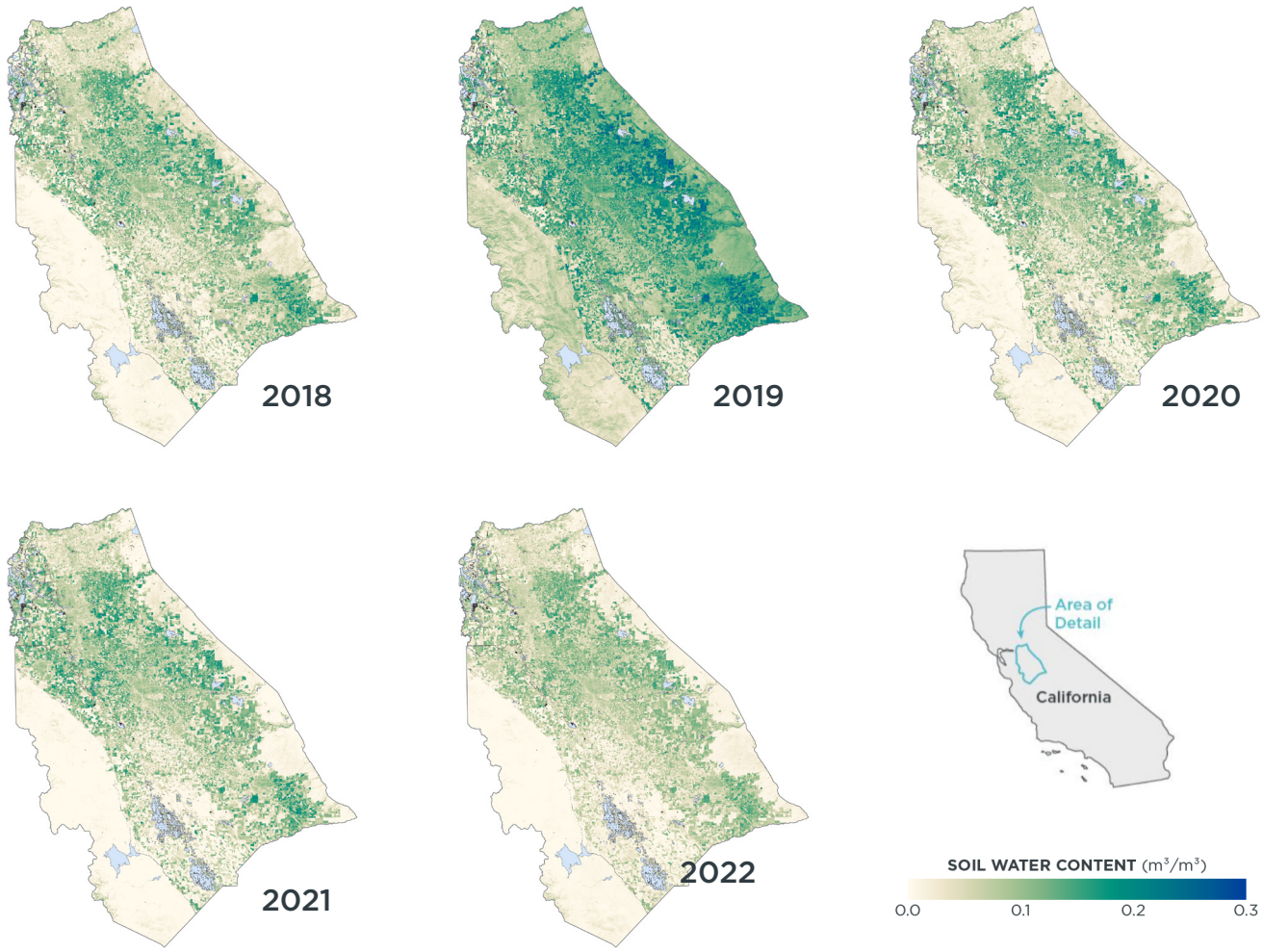
Agriculture companies use Soil Water Content data to build models that understand field conditions so their customers can make more informed decisions about irrigation and field operations. Customers also use Soil Water Content data to produce yield and crop quality predictions at the regional and field scale.



Above: Soil Water Content of fields in Douglas County, Kansas measured in 2021. Readings from vegetated and dry land show clear differences in the moisture levels over time. Below: PlanetScope imagery and Soil Water Content over the same points are visualized side-by-side.

Tracking Drought

By tracking conditions over years and decades, Soil Water Content data provides a baseline understanding of what's normal and abnormal for a given region. Drawing on this objective measurement and in collaboration with the world's most innovative reinsurers and brokers, Planet uses Soil Water Content data in 17 countries to help protect farmers from the impacts of drought.



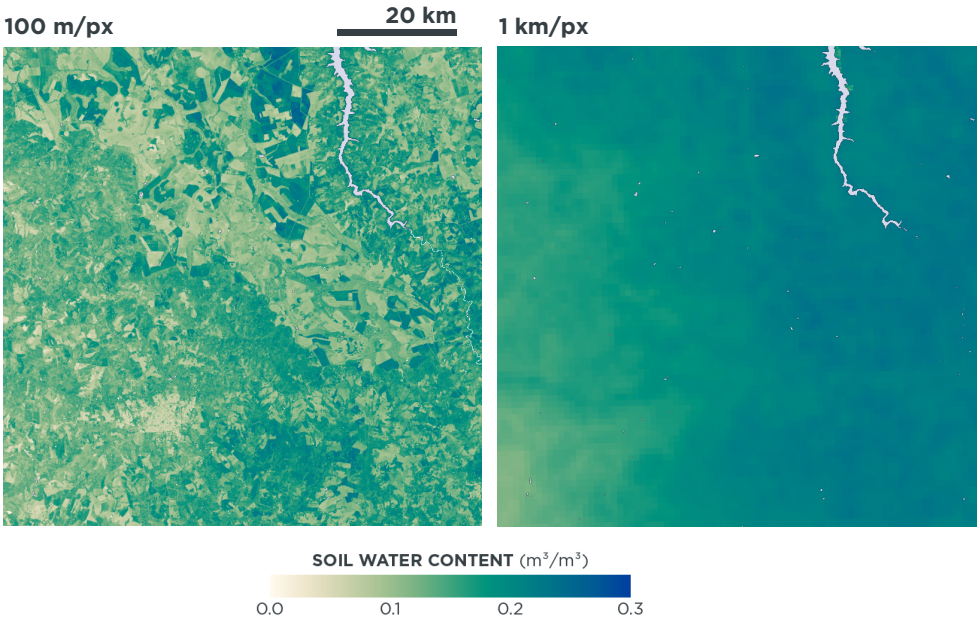
Average Soil Water Content measurement from June, from 2018 to 2022 in San Joaquin, Stanislaus, and Merced Counties, California. 2019 marked the only year since 2012 without significant drought, .

Water Management

Near real-time Soil Water Content data helps monitor complex water systems by providing insights in water demand and storage capacity. With two decades of archive data, water resource managers can understand what's normal and what's not, tracking droughts, measuring soil saturation, and assessing the effects of interventions.

Climate Risks & Environmental Impact

Building models that incorporate data on vegetation, weather, and Soil Water Content can provide granular, frequent insights into the risks for wildfires, floods, and other natural disasters. The same data can be used to assess the impact of ecosystem restoration projects. In place of in-situ sensors, Soil Water Content provides a less costly and labor-intensive mechanism to assess risk and track the effectiveness of remediation.



SPECIFICATIONS

	100 m Resolution	1,000 m Resolution
Temporal Resolution	137 to 365 observations per year (depending on latitude and frequency band)	137 to 365 observations per year (depending on latitude and frequency band)
Data Availability	2017 — present	2002 — Present (1 year gap from 2011 to 2012)
Pixel Size	100 x 100 meters	1,000 x 1,000 meters Processed at a 100 m
Satellites Used	AMSR-2, AMSR-E, SMAP, Sentinel 2	AMSR-2, SMAP, AMSR-E (June 2002 to October 2011)
Unit	m3/m3	
Sensing Depth	0 to 5 cm	
File Format	GeoTiff, NetCDF (images)	
Spatial Coverage	Global	
Latency from Observation to Availability	Plus or minus 12 hours after overpass of the satellites	

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