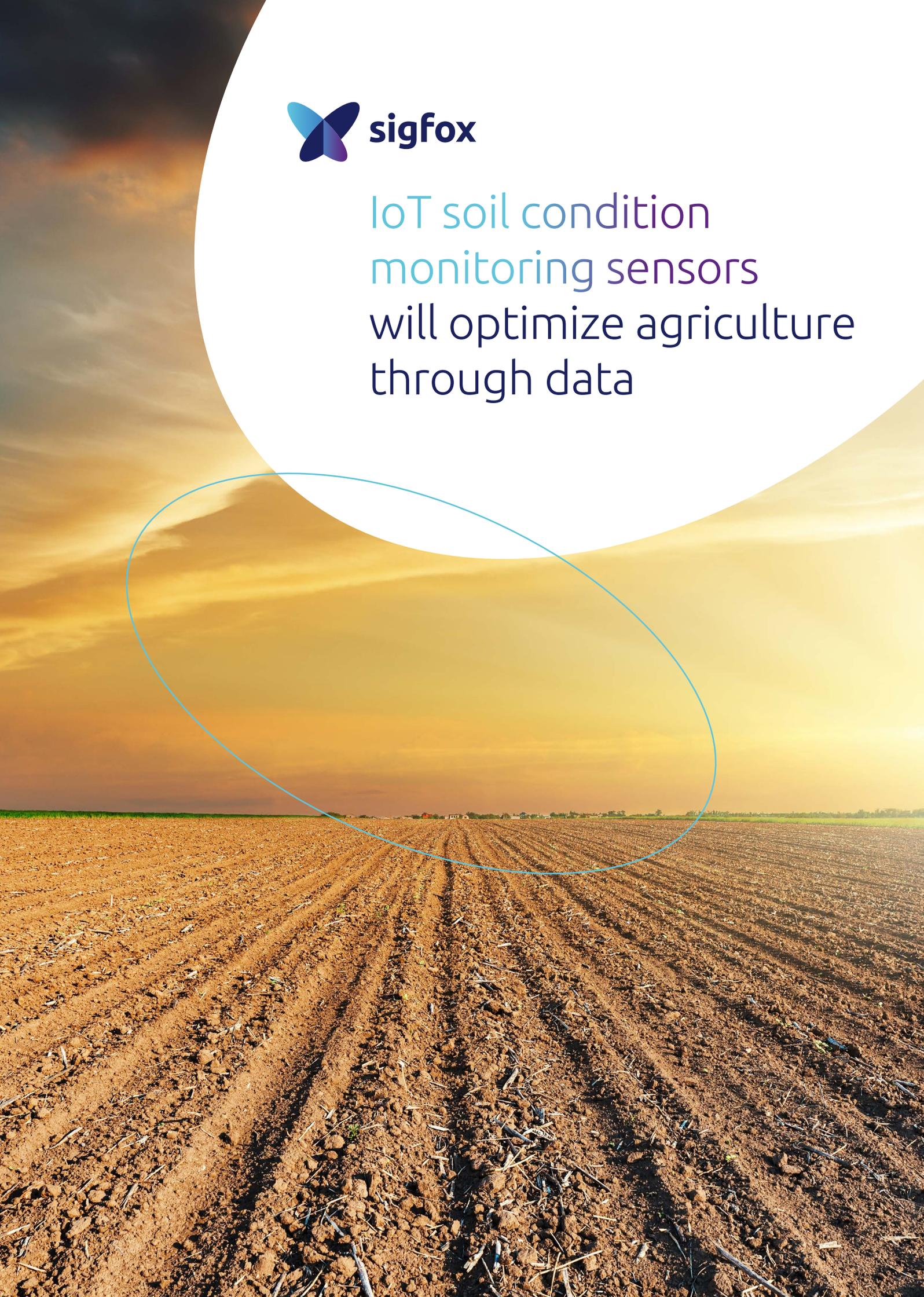
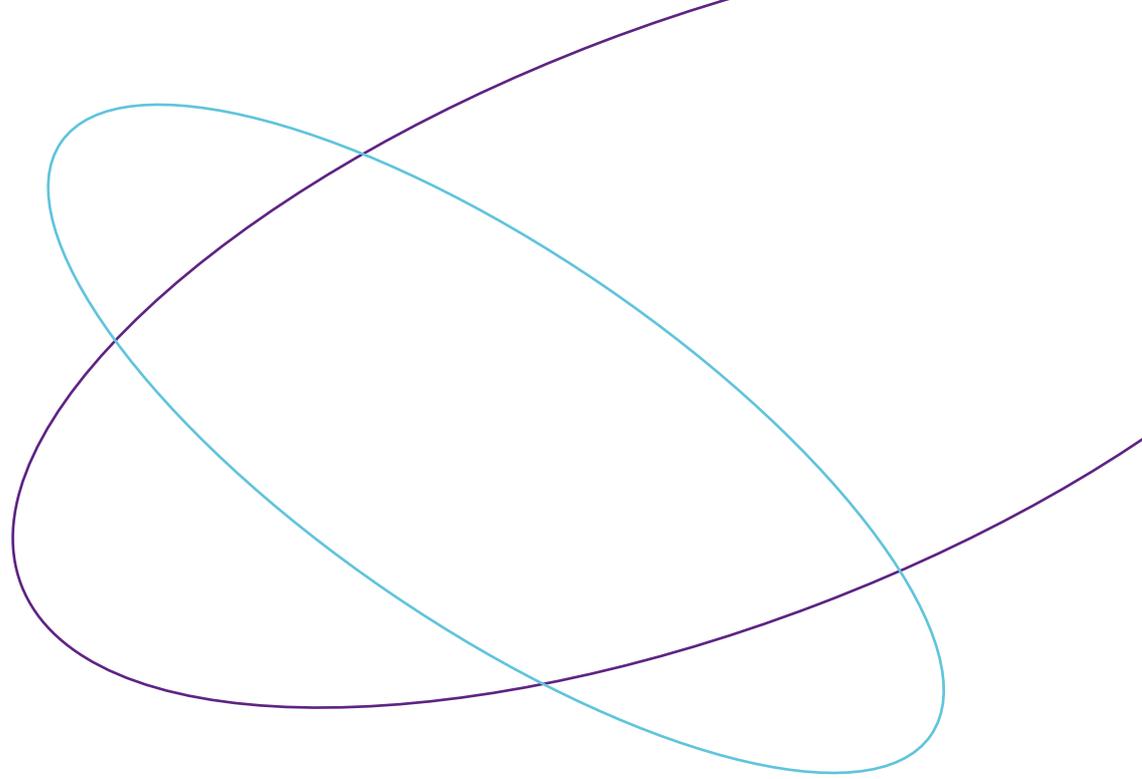




IoT soil condition
monitoring sensors
will optimize agriculture
through data





The Internet of things (IoT), which is the ability for technology in every day objects to send and receive data, will revolutionize how we do everything from transportation to communication. Agriculture also stands to benefit greatly from integrating this technology into simple electronics: **IBM estimates** that IoT will enable farmers to increase food production by 70 percent by the year 2050.

In addition to better pest management and weather forecasting, IoT could save up to 50 billion gallons of water annually, as sensors can better help farmers optimize water usage. Being able to better optimize crop management will have a transformative effect on agriculture in the following years.

The challenges farmers face today



Lots of physical maintenance required

Many trips have to be taken in order to manually check the soil humidity on a regular basis.



Difficult and inaccurate water estimates

It can be difficult to know the exact amount of water to give plants, thus causing stress for the crops by over or underwatering.



Unexpected costs and water waste

Overwatering crops could lead to higher water costs than what is really needed.



Planting times

It is sometimes difficult to know the optimal time to plant without data.



It is hard to manually track soil conditions

Manually measuring key data points about crops is often difficult, time-consuming, and more likely to be inaccurate.

Available solutions for farmers and landowners

Sigfox partners now offer IoT solutions by providing affordable sensors that monitor soil humidity/moisture levels and soil/air temperatures and automatically report it directly to the Internet without needing any Wifi, GSM or regular Internet connection.

This helps farmers know what is best for their crops without having to manually estimate or make an educated guess. With better data being fed to them live from their own crops, farmers can be the best possible decisions for planting, watering, and pest control.



Sigfox IoT enabled sensors allow farmers to instantly know several agricultural data points about crops



Soil Moisture (VWC)

Soil volumetric water content can be better monitored by using connected sensors sending data through the Sigfox IoT global network.



Soil Temperature

Crops should be planted and grown at their ideal temperature. Sensors can monitor underneath ground level temperature for an optimum reading.



Air Temperature

Tracking average air temperatures assist in determining ideal planting and watering times (and anticipating pests).

Having real-time data can help landowners and farmers reduce manpower, water usage, and other maintenance costs, thus reducing costs and environmental impact.

IoT soil condition monitoring solutions allow farmers to:

- **Vary in sample collection times and frequency:** farmers can choose and change whenever they want the number of samples per day
- **Review historical measurements,** which allows farmers to track patterns and what has worked in the past. Some technology partners even generate interactive charts for easier data analysis
- **Review instant data** through sensor mapping and smart dashboards

- **Set up automatic reminders:** Some technology can send farmers an alarm alert through SMS or e-mail if farmers' crops need to be checked
- **Back-up data:** back up data securely so it won't be lost, no matter the device farmers use to access it
- **Integrate other data sources:** Work with other data (like weather forecasts) to determine proper soil and water levels
- **View data from almost anywhere:** Wherever farmers have internet or data access, farmers can look at data from a phone, computer, or tablet
- **Diagnose issues:** Run diagnostics to determine device errors or issues
- **Provide better calibration for reporting and data analysis:** Run cloud calibration to ensure data is always up-to-date and relevant



Soil condition monitoring can help farmers collect a wealth of data that many landowners may not even know they have. Business Insider estimates that the average farm will generate over 4 million data points daily by the year 2034. It is up to the landowners to harness this data and use it to their advantage. By using Sigfox-enabled sensors to use existing land's data to decipher trends, farmers can predict crop growth and better optimize resources.

The benefits of using IoT solutions for soil conditions monitoring



In addition to monitoring the above data points to find out more about crops, Sigfox-powered sensors have a wide variety of benefits for soil monitoring, including:

Better water conservation

According to the [World Wildlife Fund](#), agriculture and farming consumes about 70 percent of the world's fresh water supply. Conserving water can ensure we don't deplete ground water reservoirs or cause excessive soil runoff into rivers and other bodies of water.

Less likely to over or underwater crops

Overwatering crops can affect how much oxygen gets to the roots, which prevents them from growing normally. In some plants, overwatering can also cause root rot, which may cause the crop to eventually die.

Underwatering crops usually has the same outcome as overwatering: without proper irrigation, crops may not grow properly or could end up withering up and dying.

Save time and resources

Less trips out to the crop field parcels to manually check soil humidity levels and temperature means more time can be spent on other parts of the business, like bookkeeping or meeting with customers.

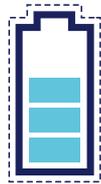
Saving time and resources often leads to greater profits, often with reduced costs and time spent on crop monitoring. By using the Internet of Things to better monitor soil conditions, farmers will find that:

- There is better management of the land through data (which is more accurate than human testing)
- Farmers can combine outside data (like weather forecasts) with their own land parcel data to optimize crop watering and maintenance
- There are less costs for employee time, water, and crop care
- Farmers have healthier crops by optimizing water and soil care

Sigfox is the best connectivity choice for better soil monitoring



Low cost



Low energy



Easy to deploy



Global

Sigfox-enabled solutions are low cost, only use a small amount of energy to run on batteries for years, and are extremely easy to set up.

With global coverage, Sigfox-powered sensors have a wide range of benefits for crop and soil monitoring needs. These sensors offer years of battery life, can work autonomously (on their own) almost anywhere, and have simple installation.

The data is already there, farmers just need the sensors to monitor and collect it. Luckily, it doesn't take much in terms of advanced knowledge to harness and utilize soil and crop data. The cost of the sensors, setup, and the technology itself are reasonable, and connectivity doesn't take special resources or expertly trained specialists. Most of the time, installation can be completed within hours.

What's more, the data collected by the sensors is secure and will never be shared without owner permission. We prioritize privacy, data integrity, authenticity, and confidentiality. User data can only be accessed using secure credentials to sign in.

With a reliable network that values a good quality of service, Sigfox and its partners are dedicated to offering a cost-effective solution for better agricultural management that is easy to set up and use.

Discover Sigfox Ready devices and IoT end-to-end solutions enabled by Sigfox: partners.sigfox.com

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