



# NDVI & PRI

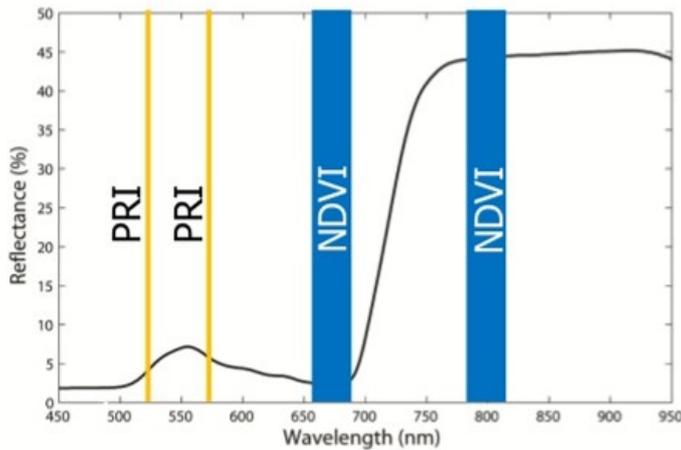
canopy spectral reflectance sensors

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## overview

- Sensors for Normalised Difference Vegetation Index and Photochemical Reflectance Index
- Measure NDVI or PRI vegetation indices at the plot or plant stand scale
- Non-destructive sampling of canopy colour, senescence and plant stress
- Collect vegetation index data unattended for days, months or years
- Use low cost, research grade sensors to maximize spatial coverage
- Improve crop growth models with spatially explicit data
- Monitor data remotely from office or phone



The SRS range of sensors to measure NDVI and PRI remove the need for cameras and vast data processes. The SRS range of sensors are easy to install, require minimal maintenance, and measure the canopy continuously throughout the growing season.

The SRS is a matchbox-sized, multiband radiometer that can be mounted on a fence post, tripod, or meteorological tower. It's inexpensive enough to deploy multiple sensors simultaneously. And it's rugged enough to leave in the field for an entire growing season, or longer.

Most spectrometers are delicate and expensive, making long-term field deployment risky. The SRS is built for long-term exposure to the elements. Key design features:

- encased in durable Gelyo housing
- epoxy-filled, watertight, and weatherproof
- fully sealed optics

These materials and methods have been tested over months and years on other buried and above ground sensors. Combined, these features help minimize drift in calibration over time.

### **individually calibrated sensors**

For accurate NDVI and PRI measurements, it is critical that every sensor is individually calibrated.

Each sensor is radiometrically calibrated to a NIST-traceable standard. Readings are output in units of radiant flux density. Calibration information is stored on board the sensor so you never have to worry about keeping track of calibration

coefficients.

#### continuous monitoring

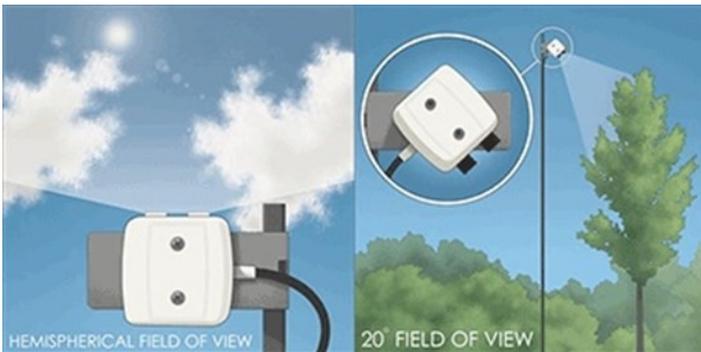
NDVI and PRI are calculated from measurements of electromagnetic radiation reflected from canopy surfaces. They are correlated with canopy variables such as:

- light use efficiency (LUE)
- biomass and crop yield
- crop and forest phenology
- canopy growth
- photosynthetic performance/CO<sub>2</sub> uptake

SRS sensors measure incident or reflected radiation in two bands:

- Normalized Difference Vegetation Index (NDVI) bands are centered at 650 nm and 810 nm with 50 nm and 40 nm full width half maximum (FWHM), respectively.
- Photochemical Reflectance Index (PRI) bands are centered at 532 nm and 570 nm with 10 nm FWHM.

#### incoming and reflected radiation



NDVI and PRI are calculated as the ratio between reflected and incident radiation, measured using downlooking and uplooking sensors, respectively. Depending on ambient sky conditions, one uplooking sensor may be able to provide reference values for multiple downlooking sensors.

Uplooking SRS sensors have a hemispherical view with Teflon diffusers providing a

cosine corrected response. They should be mounted above the canopy with an unobstructed view of the sky.

Downlooking sensors are equipped with field stops that restrict the field of view of the SRS to 36°. The field stops allow you to aim the sensor at a specific target and exclude non-canopy elements, such as a tower infrastructure, from the field of view. The sensor can be mounted to monitor single plants, row crops, plots, or forest stands. Mounting height will determine the measurement area. The measurement spot size at a nadir view angle is  $0.35 \times \text{height}$  above canopy.

Sensors are typically mounted above the canopy using a pole, post, tripod, or tower depending on the height of the canopy. Small size, low weight, and durable construction make the SRS suitable for attaching to a mobile sampling platform. They can also be attached to a mobile platform

#### **the grape monitor**

In 2017, the New South Wales Department of Primary Industries commissioned Edaphic Scientific to install a phyto-monitoring system on various varieties of grapevines.

Known as The Grape Monitor, the phyto-systems are measuring stem growth (dendrometers), sap flow, soil moisture, canopy temperature, and more parameters.

Data is uploaded to the internet via the Edaphic Scientific telemetry system. These data can be viewed at anytime.

For more information, [visit The Grape Monitor](#).

#### **whole system monitoring solutions**



Edaphic Scientific is a one-stop shop for a whole system monitoring solution. We provide plant and soil monitoring systems for researchers and growers.

Our systems not only support dendrometers, but related sensors such as sap flow, soil moisture, weather parameters, and more.

At Edaphic Scientific we want to work with you from the start of your project through to its completion. We can provide:

- Assistance with project and experimental design
- Procurement of all monitoring equipment, including sensors, data loggers and data management software. Edaphic Scientific is a one-stop shop where we can source and find any necessary equipment for your project from our preferred suppliers or third party suppliers
- Installation and training
- On-going assistance with data interpretation and equipment maintenance
- Data correction and analysis, including statistical analysis with the R-package
- Report and publication preparation including tables, figures, graphs, and manuscript writing

**advanced data collection and management solutions**



Edaphic Scientific recognises the need for flexible and adaptable sensor and [data logging solutions](#) for experimental or environmental monitoring projects.

Data can be downloaded directly in the field from data loggers. A direct connection between the data loggers and your computer, via a USB cable, can be used for manual downloading of data.

Alternatively, data can be [downloaded over the internet](#) on your iPhone, iPad or desktop computer with the Eagle.io cloud-based, data management software solutions. Through this remote based downloading capabilities, you can download, view and manage your data, and system, anywhere in the world and at anytime.

## specifications

feature	specification
NDVI Wavebands	650 ± 2 and 810 ± 2 nm peak wavelengths, with 10 nm and 10 nm full width half maximum (FWHM) band widths
PRI Wavebands	532 ± 2 and 570 ± 2 nm peak wavelengths, with 10 nm full width half maximum (FWHM) band widths
Foreoptics	(1) Cosine correcting Teflon diffuser, hemispherical field of view (2) Field stop, 36° field of view
Calibration	NIST traceable calibration to known spectral irradiance (W m <sup>-2</sup> nm <sup>-1</sup> ) or radiance (W m <sup>-2</sup> nm <sup>-1</sup> sr <sup>-1</sup> )
Accuracy	10% or better for spectral irradiance and radiance values
Measurement Time	~ 600 ms



<b>feature</b>	<b>specification</b>
Dimensions	43 x 40 x 27mm
Weight	Sensor: 47 g Sensor with 5 m cable: 170 g
Power Requirements	3.6 to 15 VDC, 4 mA (reading, 300 ms), 30µA (quiescent)
Operating Temperature	-40 to 50 °C
Cable Length	5 m standard, custom cable length available upon request
Sensor Output	SDI-12

## manual & docs

- [SRS NDVI & PRI Manual](#)
- [SRS-NDVI Integrator Guide](#)
- [SRS-PRI Integrator Guide](#)

## related products

- [Data loggers for SRS sensors](#)
- [Soil moisture sensors, probes and meters](#)
- [Soil water potential sensors](#)
- [Soil EC sensors & meter](#)
- [Sap flow sensors](#)
- [Weather stations](#)