

## Use of thermal sensors (smart buttons) in measuring the effectiveness of climate change adaptation practices in coffee plantations

**Measuring tool:** Thermal sensors (smart buttons)

**Brand and Model:** ACR Systems – Smart button

**Description:** Thermal sensors (Smart buttons) are intelligent devices capable of measuring the temperature where they are located. They can store up to 2048 readings and can be programmed to record data at intervals from 1 to 240 minutes. The temperature is recorded to the nearest 0.5°C, and stored on a datalogger inside the button. To download the data, the device has to be removed from its recording location and connected to an USB whereby it can be read by a computer through the software TrendReader.

### Use in agriculture:

Thermal sensors (smart buttons) can generate surface (or depth) temperature information of the soil, the area where coffee beans are stored or processed, temperature of environment or any other location of interest. This device is useful to record and evaluate the temperature of all kind of situations subjected to adaptation practices such as agroforestry systems, use of soil coverage and temporary sheds, among others. To avoid damage from moisture or contact with water, it is recommended to wrap them with a layer of protective plastic film or bag.

### Use in c&c:

c&c is validating different adaptation practices, including cover crops and temporary shade with the purpose of reducing the soil temperature, because temperatures above 33°C have a negative impact on the root and foliage development which contributes to reduced productivity. Smartbuttons have been placed at 5 cms. of depth and data recorded every 3 hours.

**Data generated:** Temperature °C/°F. Data should be downloaded through the software **TrendReader (supplied with the device)** and information can be exported and analyzed in Excel or other statistical analysis software.

### Use of thermal sensors (Smart buttons - SB) in coffee plantations:

| Equipment, software, adaptor and USB device   | Settling the device on the field at 5 cm depth  |
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|  A photograph showing the equipment for the smart button system. It includes a CD-ROM labeled 'SMARTBUTTON READER', a blue USB adapter, a black coiled cable, and a small black smart button device. |  A photograph showing a smart button device being placed into a hole dug in the soil. A yellow measuring tape is used to indicate the depth of the hole, which is 5 cm. A coffee plant stem is visible in the foreground. |

### Sensor (SB) under coverage



### Data generated by the sensor (SB)

