

# BUILDING A LORA WATERSENSE IOT DEVICE FOR OUTDOOR USAGE: A STEP-BY-STEP TUTORIAL



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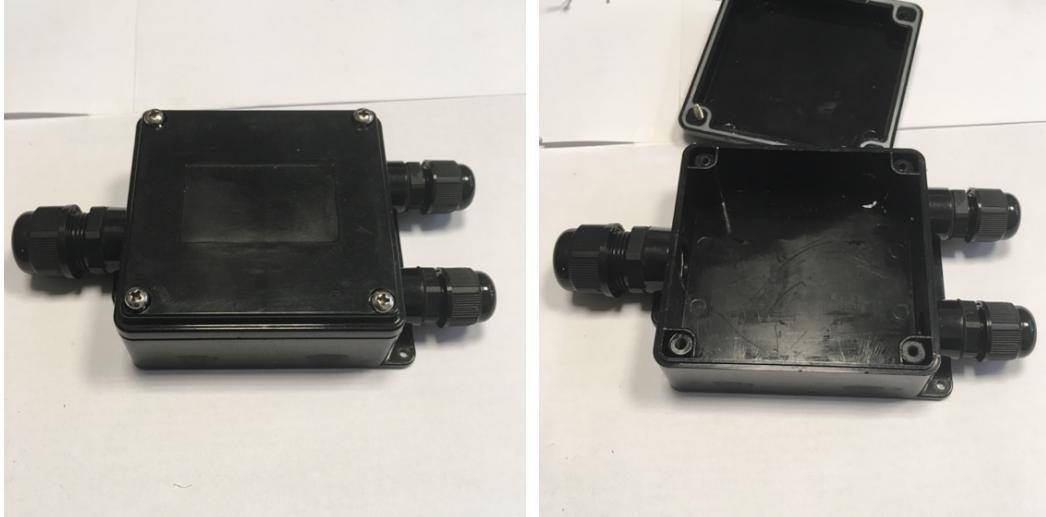
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- This could be seen as a second part of « Low-cost LoRa WaterSense IoT device: a step-by-step tutorial »
- We will show here how fit the IoT device for outdoor usage, again, at a very low cost
- Let's get started...

# GET A BOX FOR OUT-DOOR USAGE

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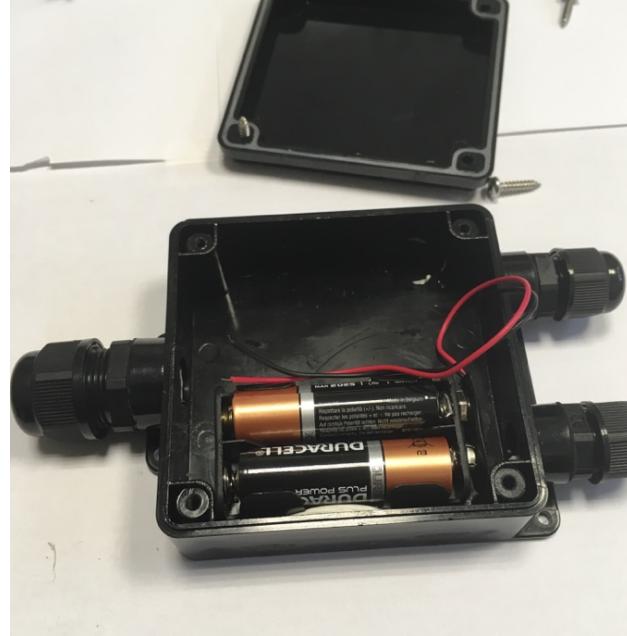
This box comes with 3 cable glands that are very convenient for the antenna cable and the 2 humidity sensor cables.  
Got it from here:  
<http://www.lextronic.fr/P34821-boitier-etanche-avec-3-presses-etoupes.html>

But you can always use a box from your local hardware store and adapt cable glands yourself.



# ADD THE POWER SUPPLY

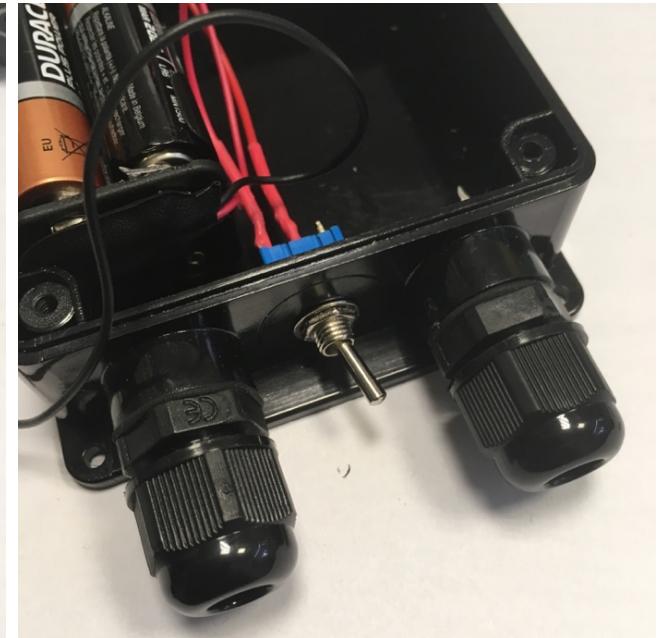
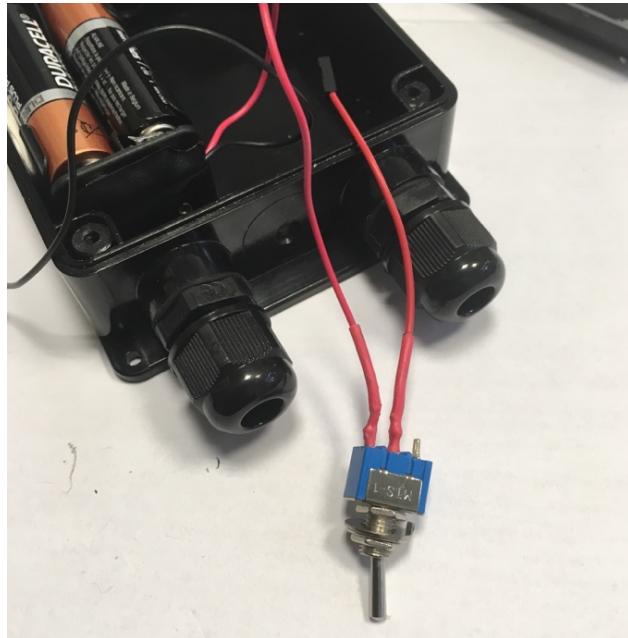
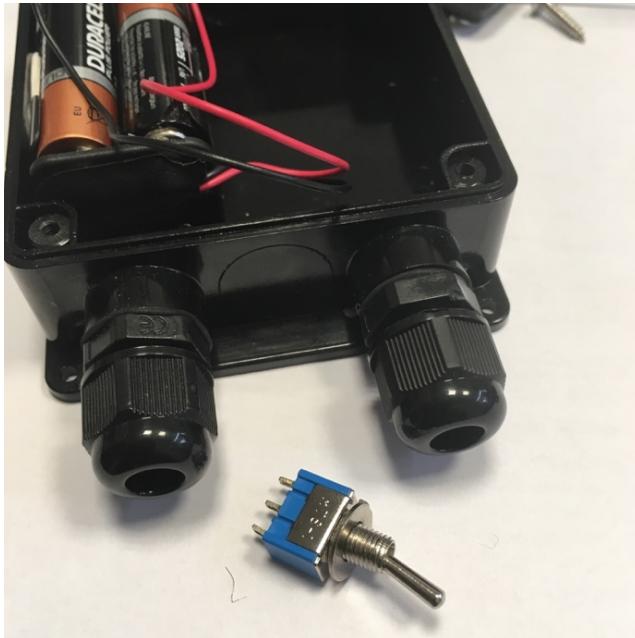
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Use compact battery coupler version. The voltage with 4-AA batteries is about 6v.

# ADD A SIMPLE POWER SWITCH

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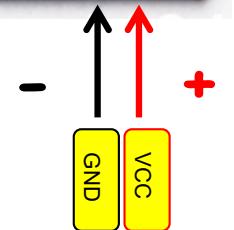
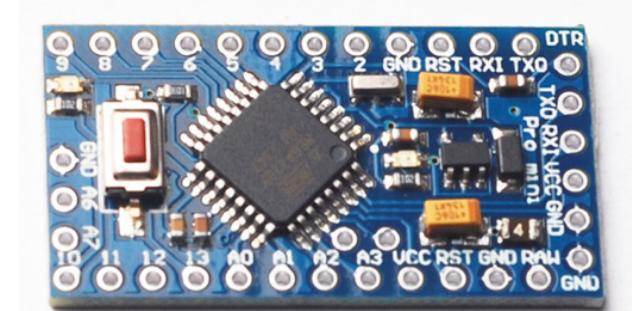
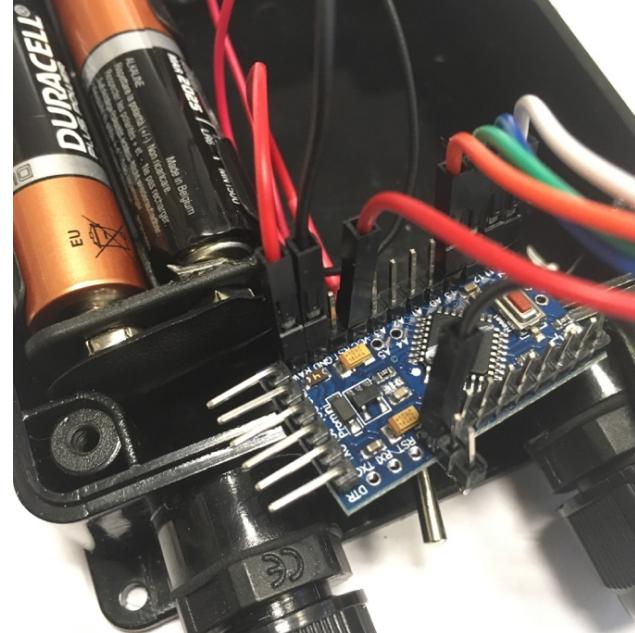
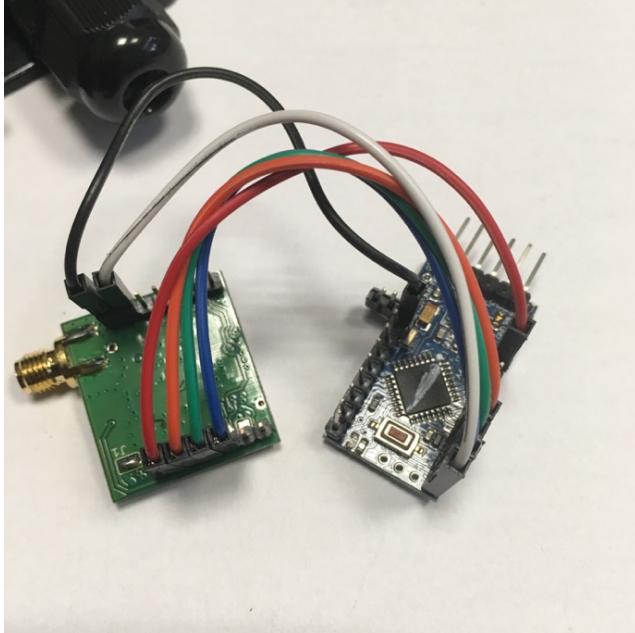


Here we need to drill a 5mm hole. This switch can be made waterproof by adding a plastic cap.



# PUTTING EVERYTHING IN THE CASE

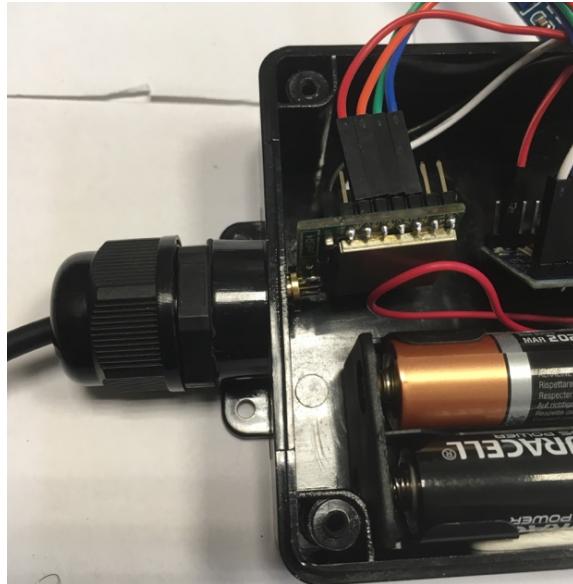
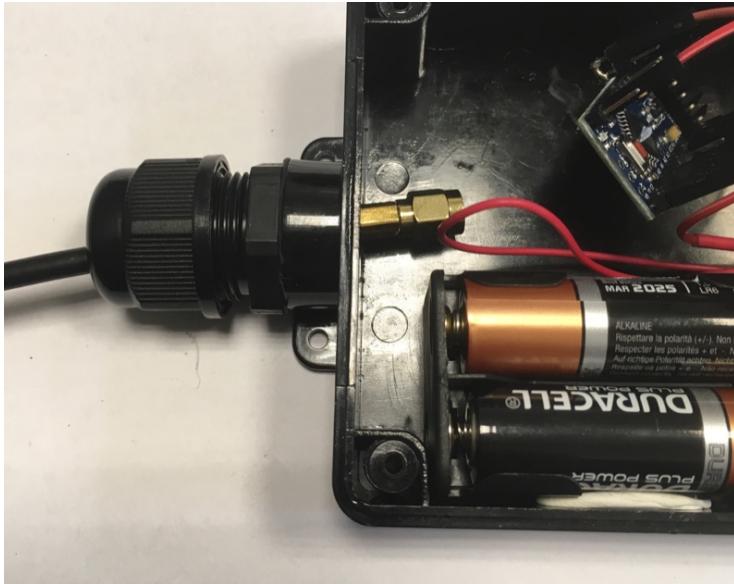
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Connect the battery coupler – (GND) wire to the Arduino GND pin, and the + (Vcc) from the switch to the RAW pin.

# CONNECTING AN ANTENNA CABLE

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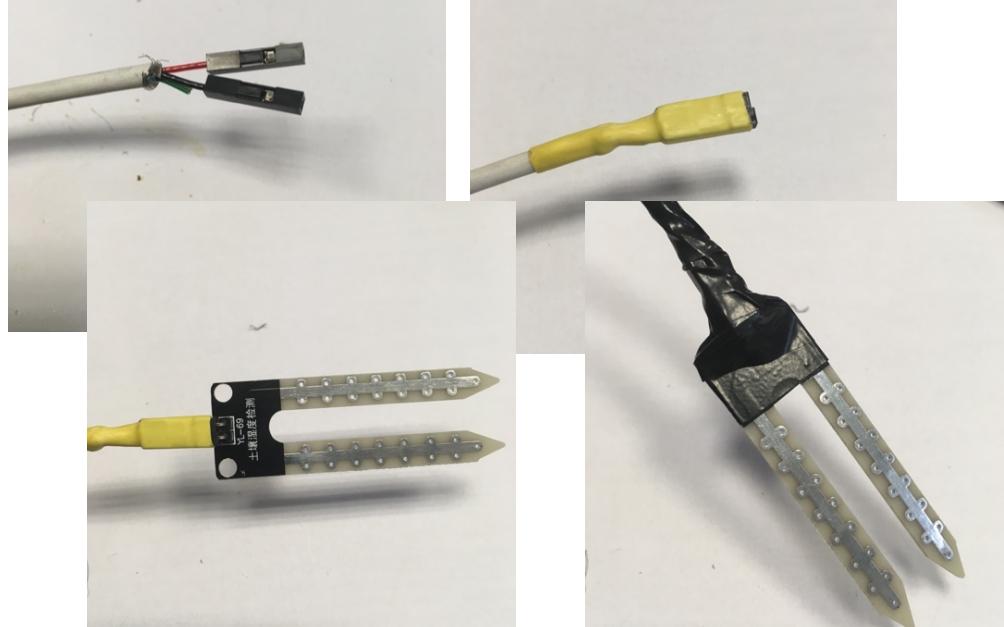
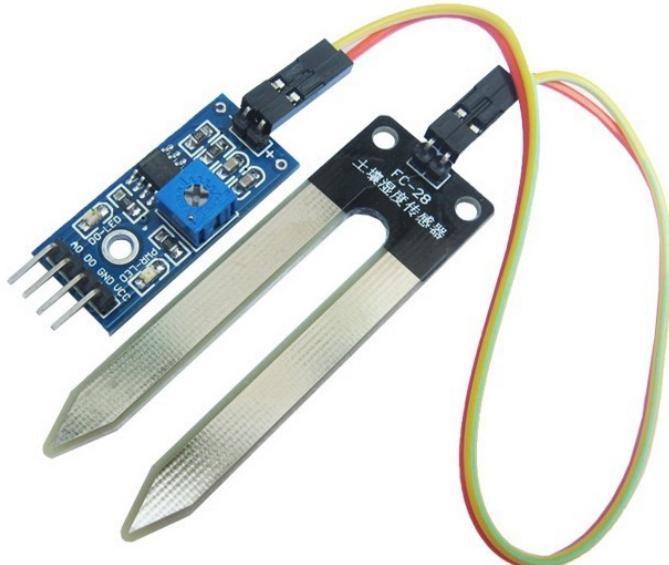
See the antenna cable tutorial to see how an appropriate antenna cable can be made to the correct length.

<https://github.com/CongducPham/tutorials/blob/master/Low-cost-LoRa-IoT-antennaCable.pdf>

Insert the antenna cable into the cable gland and then screw it to the radio module

# PREPARE THE SOIL HUMIDITY SENSOR (1)

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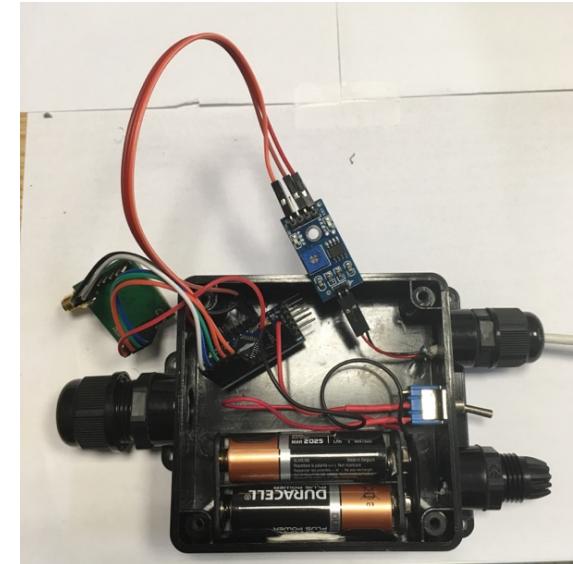
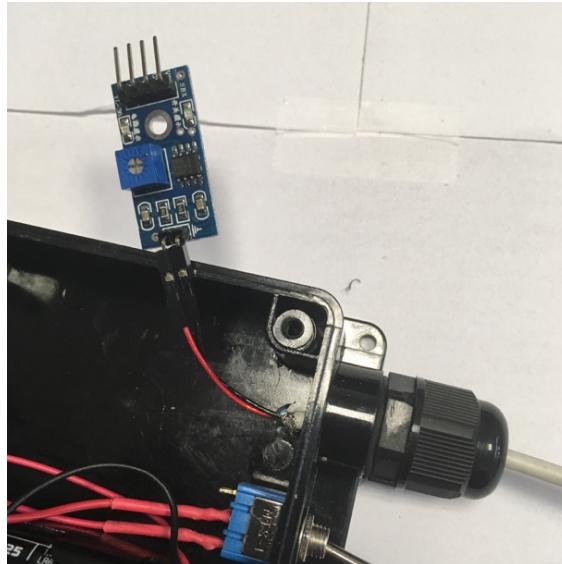
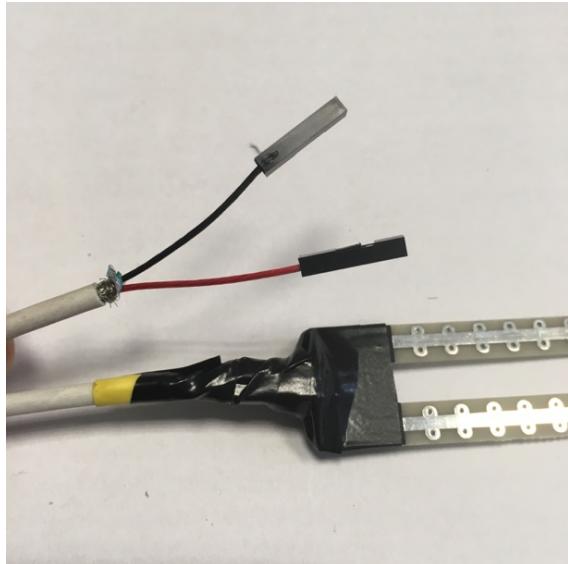


The sensor needs some preparation to be operable in outdoor conditions.

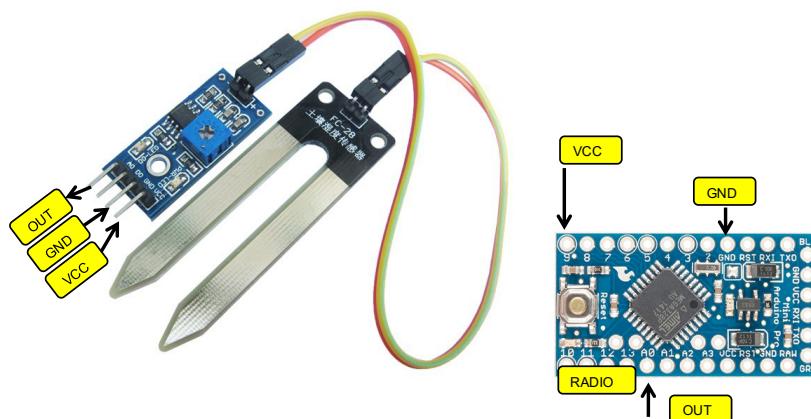
First, use a protected cable such as an old USB cable to connect the lower part of the soil humidity sensor to the circuit logic part. Only 2 wires is necessary.

Use heat shrinking sleeves to protech the connection, then add tape, starting from the bottom, to further protect the electronic part.

# PREPARE THE SOIL HUMIDITY SENSOR (2)



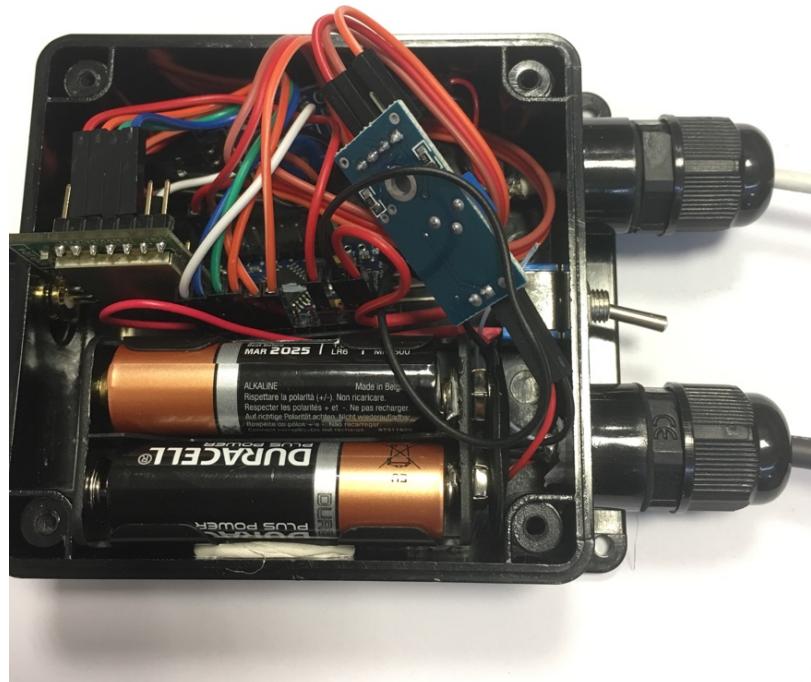
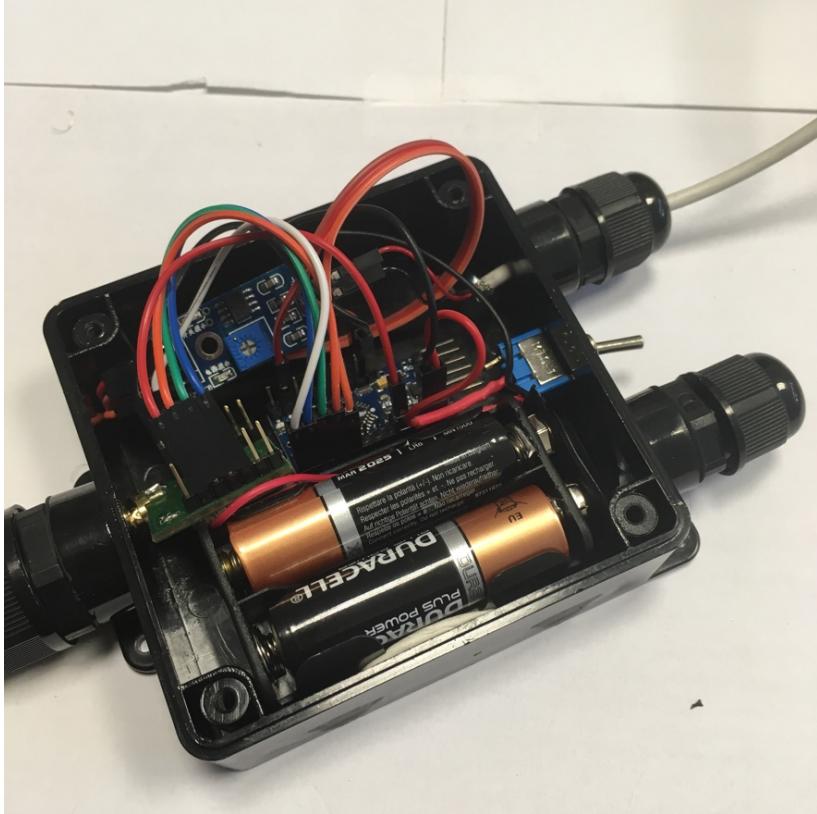
Connect the other end to the circuit logic part, passing through one cable gland.



Connect VCC to digital 9, GND to GND and OUT to analog A0.

# PLACE EVERYTHING

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You can add a second soil humidity sensor on digital 8 (VCC) and A1 (OUT). In the example sketch, uncomment `#define TWO_SHU` if you are using 2 sensors.

# PREPARE A SENSOR THAT CAN BE BURRIED



PVC tube of 40mm



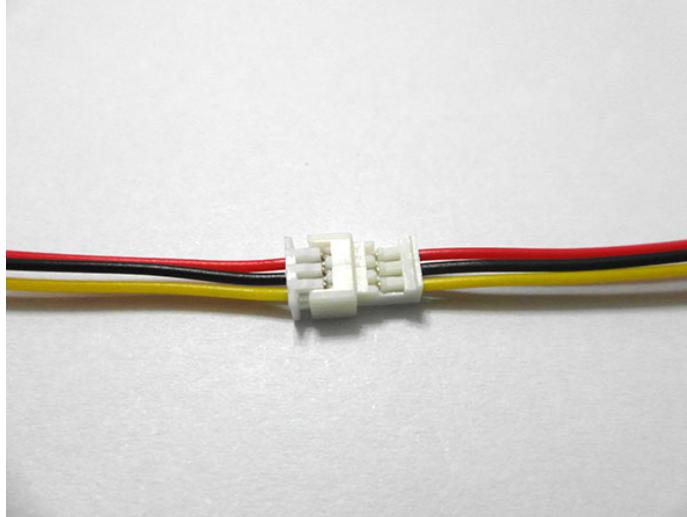
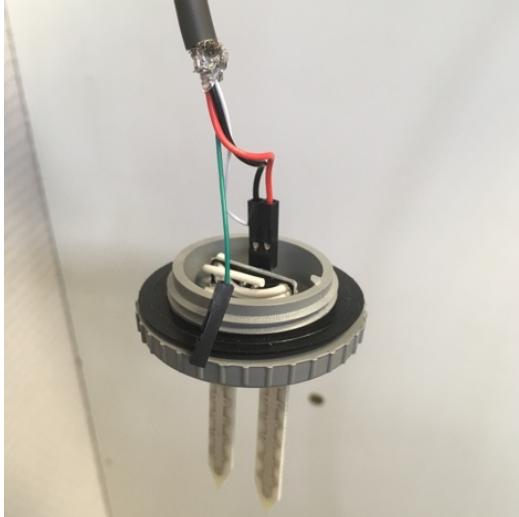
We will use PVC tube to protect the sensor that will be buried to sense the humidity level at 30cm-50cm depth.



Put some silicone/putty to avoid humidity in the tube



# CONNECTING THE SOIL MOISTURE SENSOR



It is advised to use some connector type that can secure the wiring of the soil moisture sensor, so that pulling the wire will not disconnect the sensor.



To screw the tube cap, it is advised to turn the tube by holding the cable instead of turning the cap. Doing so will prevent the cable inside the tube to be twisted.

# OUTDOOR DEPLOYMENT

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See how the antenna is connected and placed in a more favorable position using an antenna cable.



See how the case is protected from direct sun. It is recommended to not completely cover the case.

