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| **Sensors/Component** | **Function** | **Communication Interface** | **Power Supply Requirement** | **Estimated Cost (USD)** |
| MCU (ESP32) | Central controller for processing data from all sensors. | Wi-Fi, Bluetooth, UART, I2C, SPI | 3.3V - 5V DC | $5 - $10 |
| Temperature Sensor (DHT22) | Measures ambient temperature. | Digital (1-wire) | 3.3V - 5V DC | $5 - $10 |
| Humidity Sensor (DHT22) | Measures ambient humidity. | Digital (1-wire) | 3.3V - 5V DC | Included with temperature sensor |
| Air Quality Sensor (MQ135) | Measures the level of various gases in the air (CO2, NH3, NOx, alcohol, benzene, smoke, and CO). | Analog | 5V DC | $10 - $15 |
| Light Sensor (BH1750) | Measures ambient light intensity. | I2C | 3.3V - 5V DC | $2 - $5 |
| Soil Moisture Sensor (YL-69) | Measures the moisture level in soil. | Analog | 3.3V - 5V DC | $2 - $5 |
| Rain Sensor (YL-83) | Detects the presence and intensity of rainfall. | Analog | 3.3V - 5V DC | $2 - $5 |
| Wind Speed Sensor (Anemometer) | Measures wind speed. | Digital (pulse output) | 5V DC | $10 - $20 |
| Barometric Pressure Sensor (BMP280) | Measures atmospheric pressure. | I2C | 3.3V - 5V DC | $2 - $5 |
| Solar Panel (for power) | Provides renewable energy to power the system. | N/A | 5V DC (with regulator) | $10 - $20 |
| Battery (LiPo 3.7V 2500mAh) | Stores energy to power the system when solar energy is not available. | N/A | 3.7V DC | $10 - $15 |
| Power Management Module (TP4056) | Manages battery charging and power supply | N/A | 3.7V DC, 5V DC output | $2 - $5 |