**1. Agriculture CubeSat (Multispectral/Hyperspectral Imaging)**

**Key Mission Goals:**

* Monitor crop health.
* Detect vegetation indices like NDVI (Normalized Difference Vegetation Index).
* Assess soil moisture and plant stress.

**Recommended Sensors:**

1. **Hyperspectral Sensor**:
   * **Sensor**: **Headwall Nano-Hyperspec**
   * **Purpose**: Detailed spectral analysis of vegetation and soil health.
2. **Multispectral Camera**:
   * **Sensor**: **Sentera 6X Multispectral Camera** or **MicaSense RedEdge-P**.
   * **Purpose**: Captures key vegetation indices like NDVI, GNDVI, and NDRE.
3. **Thermal Infrared Camera**:
   * **Sensor**: **Teledyne FLIR Lepton**.
   * **Purpose**: Monitor plant canopy temperature to assess water stress.
4. **Optical RGB Camera** (Optional):
   * **Sensor**: Compact high-resolution optical cameras (e.g., **Sony IMX378**).
   * **Purpose**: Provide visual context for hyperspectral/multispectral data.

**Additional Considerations:**

* Ensure proper spectral band alignment for agricultural monitoring (e.g., red, near-infrared, blue).
* Include onboard data processing for vegetation indices to reduce downlink bandwidth.

**2. Water Monitoring CubeSat (Salinity, Turbidity, pH, Temperature)**

**Key Mission Goals:**

* Assess water quality for agricultural irrigation.
* Monitor parameters like salinity, turbidity, pH, and temperature.

**Recommended Sensors:**

1. **Salinity Sensor**:
   * **Sensor**: **Sea-Bird Scientific CTD** (miniaturized version).
   * **Purpose**: Measures conductivity (linked to salinity), temperature, and depth.
2. **Turbidity Sensor**:
   * **Sensor**: **TriOS Opus** or a miniaturized version of **Seapoint Turbidity Meter**.
   * **Purpose**: Detect suspended particles affecting water clarity.
3. **pH Sensor**:
   * **Sensor**: **Atlas Scientific EZO-pH Sensor**.
   * **Purpose**: Measure pH levels to evaluate water acidity or alkalinity.
4. **Temperature Sensor**:
   * **Sensor**: **Melexis MLX90614** or a compact CTD with temperature sensing.
   * **Purpose**: Monitor water surface temperature.