Supplementary Table S1: Certified Agricultural Drones and their Applications

Country	Certification	UAV	Manufacturer	Application
United States	Federal Aviation Administration (FAA)	DJI Agras T20	Shenzhen DJI Sciences and Technologies Ltd	Crop spraying, seeding, and field mapping.
		Sentera PHX	Sentera	Crop health monitoring, yield estimation, and field scouting.
		PrecisionHawk Lancaster	PrecisionHawk	Aerial imaging, NDVI (Normalized Difference Vegetation Index) analysis, and field mapping.
European Union	European Union Aviation Safety Agency (EASA)	Parrot Bluegrass Fields	Parrot	Crop monitoring, soil analysis, and field mapping.
		Yamaha RMAX	Yamaha Motor Co.	Crop spraying and pest control.
		senseFly eBee Ag	senseFly, a Swiss company	Crop health monitoring, field mapping, and land surveying.
China	Civil Aviation Administration of China (CAAC)	DJI Agras MG-1	Shenzhen DJI Sciences and Technologies Ltd	Crop spraying, pest control, and fertilization.
		XAG P30	Xaircraft	Precision spraying, seeding, and field mapping.
		TT Aviation Crop Sprayer	Beijing TT Aviation Technology Co. Ltd.	Crop spraying and field scouting.

Australia	Civil Aviation Safety Authority (CASA)	Altura Zenith	Altura Zenith	Crop health monitoring, yield estimation, and field scouting.
		Swoop Aero Kookaburra	Swoop Aero	Crop spraying and pest control.
		Yamaha Fazer R	Yamaha Motor Co.	Aerial imaging, field mapping, and crop monitoring.
Japan	Japan Civil Aviation Bureau(JCAB)	Yamaha RMAX	Yamaha Motor Co.	Crop spraying and pest control.
		DJI Agras T16	Shenzhen DJI Sciences and Technologies Ltd	Crop spraying, fertilization, and field mapping.
		Nileworks Nile-T18	Nileworks Inc.	Crop health monitoring, pest control, and field mapping.
India	Directorate General of Civil Aviation(DGCA)	Garuda Aerospace Kisan Drone	Garuda Aerospace Private Limited	Crop spraying, seeding, and pest control.
		Thanos V1200	Thanos Technologies	Crop health monitoring, soil analysis, and field mapping.
		Aarav Unmanned Systems AGRI	Aarav Unmanned Systems	Aerial imaging, NDVI analysis, and field scouting.

Supplementary Table S2:

IoT sensors used in precision agriculture, showcasing their role in enabling real-time, data-driven agricultural practices.

Sensor Name	Manufacturer	Data Type Collected	Wireless Data Transfer Method
Decagon EC-5	METER Group	Soil moisture, electrical conductivity, temperature	ZigBee, Bluetooth
Teros 12	METER Group	Soil moisture, salinity, temperature	ZigBee, Wi-Fi
GreenSeeker	Trimble Inc.	NDVI, crop health, nitrogen levels	Bluetooth, GSM
FluorPen FP110	PSI (Photon Systems Instruments)	Photosynthetic activity, chlorophyll fluorescence	USB, Bluetooth
PAR Sensor	Apogee Instruments	Photosynthetically Active Radiation (PAR) levels	ZigBee
10HS Moisture Sensor	METER Group	Soil moisture content	ZigBee, Wi-Fi
SoilPro	SoilPro Services	Soil pH and electrical conductivity	LoRa,Wi-Fi,Zigbee
Yara N-Sensor	Yara International	Nitrogen content in crops	GPS,Wi-Fi
AquaSpy	AquaSpy, Inc.	Root zone soil moisture and temperature	Wi-Fi,Bluetooth
PhenoCam	Phenocam Network	Crop phenology (growth stages, canopy cover)	Wi-Fi, Satellite Communication
Parrot Sequoia	Parrot SA	Multispectral imaging for plant health and nutrition	Wi-Fi,Mobile Apps & Cloud Integration
Sentek Drill & Drop	Sentek Technologies	Soil moisture, temperature, and salinity at multiple depths	Wi-Fi,Cellular Networks
Davis Vantage Pro2	Davis Instruments	Temperature, humidity, rainfall, wind speed/direction	Wi-Fi, GSM, LoRa