



**Alliance for AI, IoT and Edge  
Continuum Innovation**



**NETWORLD  
EUROPE**

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# **The role of digital technologies and advanced communications in sustainable agriculture**

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# Context: future of EU agriculture



- ***“Agrifood systems that are more resilient, sustainable, competitive, profitable, and just”***
- Produce **more food of high quality with less resources** and carbon footprint, protecting nature and biodiversity while fostering a globally sustainable and resilient farming sector.
  - *“the sector operates within planetary boundaries and contributes to the protection and restoration of the climate, ecosystems, and natural resources, including water, soil, air, biodiversity, and landscapes*

[https://agriculture.ec.europa.eu/document/download/171329ff-0f50-4fa5-946f-aea11032172e\\_en?filename=strategic-dialogue-report-2024\\_en.pdf](https://agriculture.ec.europa.eu/document/download/171329ff-0f50-4fa5-946f-aea11032172e_en?filename=strategic-dialogue-report-2024_en.pdf)

# Role of digital technologies



## From traditional agriculture to **precision agriculture**

- Integration of data-driven technologies, such as **sensors, autonomous robots, data analytics, AI,...** to optimize agricultural practices.
- Increase of **productivity** and **food quality**
- Reduction of **environmental impact**

## Enabling novel farming techniques: **vertical farming**

- Fine control of **growth and health parameters**
- **Smart lighting**
- Maximisation of **productivity** and **food quality**
- Minimisation of **waste and environmental impact**

## **Environmental and biodiversity monitoring**

- **Preservation** of landscapes and biodiversity (CAP)
- **Control** of biodiversity (species), soil health, pollutants, illegal activities, forests...

# Main technology drivers

	Precision agriculture	Vertical farming	Environmental and biodiversity monitoring
Smart sensing and monitoring	XX	XXX	XX
Farm management systems	XXX	XXX	
Digital twins	XX	XXX	XX
AI for pattern identification, decision making, prediction, recommendation...	XXX	XXX	XX
Autonomous and cooperative machines	XX	XXX	X
Surveillance			XXX

# Technology opportunities and challenges relevant to Next-Gen Smart Networks

	Smart sensing	Farm management systems	Digital twins	Autonomous and coop machines	Surveillance
Ultra-low power communications	X				X
Massive Machine Type Communication (MTC)	X			X	
Reliable, high-throughput communications		X		X	
Accurate geo-location	X			X	
Decentralized data analysis and decision making Low-latency, edge computing		X	X	X	
AI as a service		X	X	X	X
Joint comms and sensing	X			X	

# Transversal opportunities/challenges



## Sustainability

- Energy efficiency:
  - Comms networks
  - Computation (ML and AI)
  - Sensors and actuators
- Environmentally friendly electronics

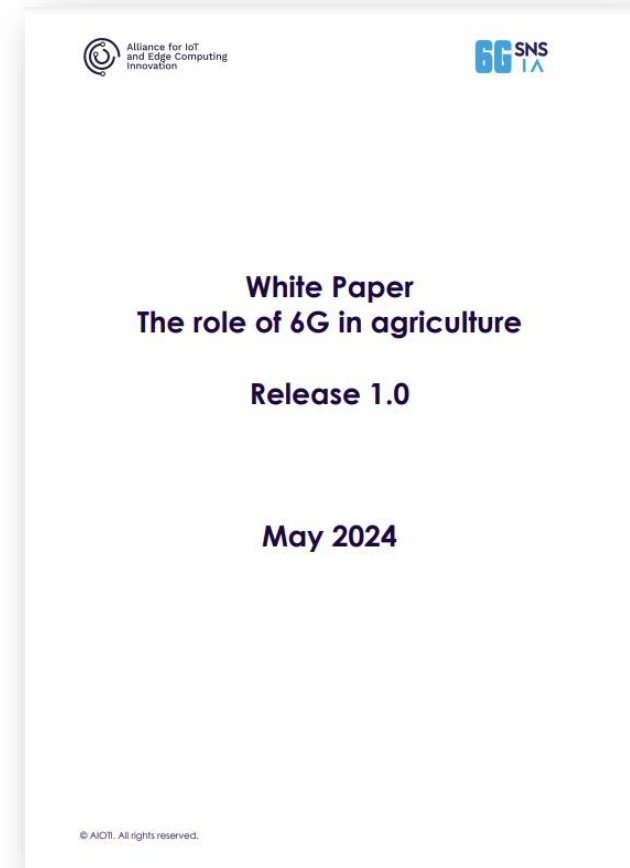
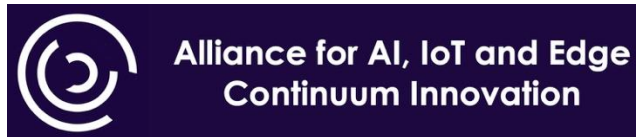


## Ubiquitous connectivity

- Agricultural and remote areas face a lack of proper wireless networks coverage.
- Currently hampering development of AI and advanced services in agriculture.

# Further info

Joint paper between AIOTI and 6G-IA:  
<https://aioti.eu/wp-content/uploads/6GIA-AIOTI-White-Paper-Agriculture-Final.pdf>





**Thank you for listening**