AgriVision: Extended Reality for Efficient & Sustainable Farming

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Summary

AgriVision is co-developed by *bSpoke Solutions* and the *University of Macedonia* under the EU-funded **CORTEX**[2] project and aims to:

- ***Empower farmers*** *by integrating* ***XR*** *with* ***Farm Management Information Systems*** *(FMIS)*
- Offer ***intuitive tools*** bridging the tech gap with sustainable, field-tested, data-driven farming innovation.

Introduction

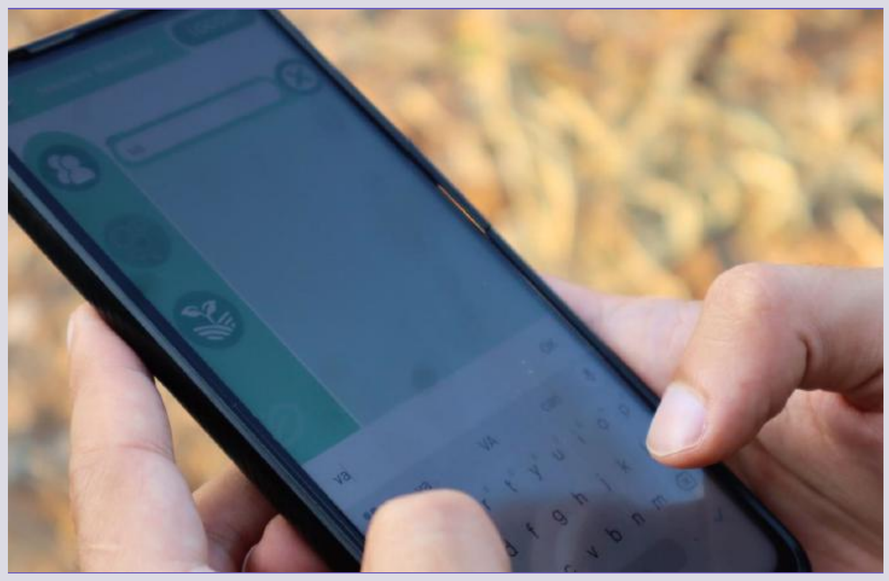
Modern agriculture **faces increasing pressures** from climate variability[1], and resource constraints[2], **demanding smarter, scalable technologies** to ensure resilience and productivity. **Traditional digital tools often fail** to serve farmers due to usability and cost barriers.

XR technologies have shown growing promise in enhancing productivity, and remote collaboration[3]. This trend highlights the need for more inclusive and interactive agricultural innovations, enabling better decisions, and more sustainable farm management practices across diverse contexts.

AgriVision Overview

AgriVision combines XR, FMIS, and CORTEX[2] components to improve farm productivity and sustainability:

- ✓ **FMIS services**: (a) parcel-level weather, (b) pest and disease forecasting, (c) crop growth, (d) irrigation and (e) fertilization
- ✓ **CORTEX[2] tools**: video conferencing, cortex virtual assistant, meeting summarization and user role management
- ✓ **Pro version**: immersive spatial data visualization on XR headsets (Microsoft Hololens 2, Vizux M400)
- ✓ **Light version**: mobile app delivering full FMIS and CORTEX features affordably



Pilot Evaluation

28 Early Adopters

Usability: **Farmers** valued the **Light version's** intuitive design; **consultants** appreciated the **Pro version's** immersive XR.

Impact: Crop monitoring, fertilization, pest forecasting, and irrigation improved efficiency and treatment timing.

XR Feedback: Users preferred **Hololens** for better visualization; Vuzix was more portable but lower quality.

End-User Suggestions: Multilingual support, expanded pest databases, and customizable fertilization inputs were requested.

[1]*Khatri, P., Kumar, P., Shakya, K. S., Kirlas, M. C., & Tiwari, K. K. 2024. Understanding the intertwined nature of rising multiple risks in modern agriculture & food system. Environment, Development & Sustainability, 26(9), 24107-24150.*
[2]*Mondal, S., & Palit, D. 2022. Challenges in natural resource management for ecological sustainability. In Natural resources conservation and advances for sustainability pp. 29-59, Elsevier.*
[3]*Tzounis, A., Katsoulas, N., Bartzanas, T., & Kittas, C. (2022). Applications of extended reality (XR) in agriculture, livestock farming, and aquaculture: A review. Smart Agricultural Technology, 2, 100070*

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