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Creating partnerships in smart farming education and setting up a future education agenda

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1 Executive Summary

For Activity 2.3 "Creating partnerships in smart farming education and setting up a future education agenda", there were two main difficulties. The first and foremost problem we identified is that a "Memorandum of Understanding" is an official legal document for universities. To solve this problem, we created a "Letter of support" (LoS). This LoS is also a conceptual document that verifies the strategic framework for partnering, collaboration, and action with new partners from Industry, Associations, and Educators in the field of Smart Farming in the European Union and abroad. As a result of the first problem with the difficulties with the "Memorandum of Understanding" (now: "Letter of support"), more time was needed to fulfill the Act. 2.3. Furthermore, creating partnerships is an ongoing process, and the USAGE NG project is always promoted at conferences, meetings, and fairs.
Activity 2.3 successfully established a broad international network of universities, farmer associations, industry partners, and vocational training institutions through an extensive collection of thirteen Letters of Support. These partners provided valuable insights into the educational needs of smallholders and the future of smart farming.
Stakeholder engagement, including the Multiplier Event at TUM, revealed that hands-on, practice-oriented training and Train-the-Teacher approaches are essential, as online-only formats are often unsuitable for small-scale farmers. Two master's theses further highlighted structural gaps in agricultural education, digital literacy challenges, and connectivity barriers affecting the adoption of smart farming.
Based on these inputs, the activity developed a competence framework for innovative smallholders, covering technical, operational, learning, and ecosystem-related skills. Overall, Activity 2.3 provides a strong foundation for designing mobile learning materials and future educational initiatives aligned with real-world needs in the agricultural sector.

2 Report

Activity 2.3 focused on identifying, engaging, and clustering relevant organizations, networks, and industrial partners to support the long-term development of innovative educational initiatives in agricultural engineering. In accordance with the project objectives, the activity placed particular emphasis on capturing diverse perspectives from practitioners, industry representatives, and academic experts to inform mobile learning opportunities for smallholder farmers. Furthermore, the activity developed a consolidated overview of desirable competences for innovative smallholders, based on empirical research and structured stakeholder consultations.

2.1 Letters of Support

At the outset of the activity, the consortium conducted extensive outreach to European and international institutions. This resulted in a broad collection of Letters of Support that reflect a strong interest in future cooperation. Among the earliest supporters was ON Projects Advising SL (Spain), represented by Dr. Iacopo Benedetti, who offered expertise in project development, evaluation, and international networking. Their commitment contributed to strengthening the project's strategic alignment and securing pathways for long-term collaboration. In parallel, the agricultural producer organization COAG Jaén (Spain), led by Dr. Juan Carlos Muñoz Flores, provided essential insights into the needs and challenges of small and medium-sized farms. Their involvement ensured that the perspectives of active farmers and smallholders were embedded in the project's educational agenda from the beginning.

Further significant support came from Associazione Agricoltura è Vita (Italy), represented by Dr. Matteo Ansanelli, whose long-standing experience in agricultural vocational training and technology-oriented knowledge transfer enriched the project's understanding of continuing education needs in the sector. The academic partners in Türkiye expanded the geographical and thematic reach of the project: Ondokuz Mayıs University contributed expertise in agricultural engineering education and technology transfer, while Çukurova University, represented by Prof. Kubilay Vursavus, brought extensive knowledge in agricultural machinery, sensor technologies, and smart farming systems in smallholder environments. In addition, Ankara University, represented by Prof. Dr. Kamil Sacilik, added valuable expertise in mechanisation, digital agriculture, and capacity building for agricultural educators. These six institutions formed the initial foundation for a diverse and international collaboration network.
As the project progressed, additional Letters of Support were obtained, further broadening the network. ANTAM T.R.U. (Italy), represented by Sandro Liberatori, contributed an international standardisation perspective, particularly relevant for understanding safety, testing, and regulatory environments for agricultural machinery. Industrial stakeholders such as AlzChem Group (Germany) and Bayern Genetik GmbH added important insights related to crop nutrition and livestock breeding technologies. BEDM GmbH (Germany) strengthened the technological dimension of the network with expertise in engineering and digitalisation. The engagement of the University of Nebraska–Lincoln (USA) introduced a transatlantic academic dimension, enabling comparisons between European and American approaches to digital agriculture. Finally, the Südtiroler Bauernbund (Italy) added the perspective of mountain farming and small-scale producers, reinforcing the activity's commitment to smallholder relevance.
Beyond the Letters of Support, Activity 2.3 integrated perspectives from interactive stakeholder events. The First Multiplier Event, held at the Technical University of Munich, brought together university lecturers, vocational teachers, DEULA training center staff, and students. The event demonstrated substantial disparities in digital readiness and highlighted the limitations of online-only learning for smallholder farmers. Practical experience with machinery and "learning by doing" emerged as essential components of effective training. Participants also emphasized the lack of time, training opportunities, and teaching materials for educators responsible for smart farming subjects. These insights reinforced the need for blended learning models, Train-the-Teacher programs, and low-barrier digital material repositories.

2.2 Student Thesis

In addition to stakeholder consultations, Activity 2.3 incorporated substantial empirical evidence through two Master's theses conducted within the project. Christopher Dorok's thesis investigated the structure, fragmentation, and coordination challenges within agricultural engineering education. His findings showed that teachers across the sector often lack opportunities for continuing education in smart farming technologies and that modular, practice-oriented materials are urgently needed. Dorok also identified institutional barriers that impede the dissemination of innovative content, underscoring the importance of flexible and mobile educational formats.
The second thesis, conducted by Christina Sebald, analysed smart farming adoption among farmers in the European Union and the United States. Her survey-based research highlighted that technology adoption is highly dependent on digital literacy, access to reliable information, and rural connectivity. Many farmers, especially those in remote areas, face infrastructural limitations that restrict their ability to participate in highly digital learning environments. Farmers also expressed a preference for practical, problem-oriented training materials rather than abstract theoretical content. These findings strongly influenced the development of the competence framework for innovative smallholders.
Drawing on all stakeholder inputs, the Multiplier Event findings, and the two Master's theses, Activity 2.3 produced a comprehensive competence framework for innovative smallholders.

This framework includes technical competences related to the operation and interpretation of digital technologies and sensors; operational competences that support the use of blended learning materials and sustainable farm management practices; learning and innovation competences such as critical evaluation of new technologies and engagement in continuous professional development; and ecosystem competences covering regulatory awareness, sustainability requirements, and socio-economic constraints.

3 Conclusion

Overall, Activity 2.3 successfully achieved its objectives by creating a robust, diverse, and international partnership network; clustering stakeholder perspectives from education, industry, farming, and research; identifying suitable partners for future training initiatives; and defining the key competences required by innovative smallholders. The outcomes of this activity provide a strong conceptual and empirical foundation for the development of the project's mobile learning materials and future-oriented curricula in WP3 and WP4. The results will enable the consortium to design educational tools that are both technologically sound and deeply aligned with the practical needs of smallholder farmers, thereby strengthening the relevance, usability, and impact of the USAGE-NG project.