CEMA's position on Agricultural Robots

Position Paper

Agricultural robots, especially autonomous machinery, hold strong potential to help tackle key challenges in modern agriculture, such as labour shortages, climate pressures, and the growing need for sustainable food production.[1] The agROBOfood project[2] has demonstrated the potential of robotics to support in transformation of farming practices[3], and this position paper outlines the key benefits and risks associated with these technologies from the perspective of the European agricultural machinery industry.

As the voice of the agricultural machinery industry in Europe, CEMA plays a critical role in representing the interests of technology providers and fostering innovation. The sector provides advanced solutions to farmers of all sizes, and agricultural robotics is emerging as a key enabler of sustainable and efficient farming. CEMA's involvement in EU-funded projects such as agROBOfood ensures that the agricultural machinery industry remains informed and at the forefront of digital and robotic transformation, supporting farmers and addressing societal challenges.

Benefits of Agricultural Robots

1. **Increased Efficiency and Productivity**
   - Autonomous machinery enables 24/7 operations, reducing the reliance on human labour and improving overall productivity.
   - Precision farming techniques facilitated by robotics optimize resource use, including water, fertilizer, and plant protection products, leading to cost savings and environmental benefits.
2. **Sustainability and Environmental Impact**
   - Robotics support sustainable practices by reducing emissions and enhancing soil health through minimal tillage and controlled traffic farming.
   - Precision application of inputs reduces waste, contributing to environmental conservation.
3. **Labour Solutions**
   - Addresses the shortage of skilled agricultural labour by automating repetitive and labour-intensive tasks.
   - Reduces the risk of injuries and improves working conditions for farmers.
4. **Enhanced Crop and Livestock Management**
   - Robots equipped with advanced sensors provide real-time monitoring of crops and livestock, enabling early detection of diseases and pests.

[1] https://ec.europa.eu/eip/agriculture/en/digitising-agriculture/developing-digital-technologies/robotics.html

[2] https://agrobofood.eu/

[3] https://www.cema-agri.org/publications/21-articles/1057-agrobofood-project-issues-its-final-report

- Automated systems can enhance food safety by ensuring consistent quality. The addition of calibrated sensors and secure, traceable data flows from such systems can enhance quality control over the chain.

5. **Adaptability to Market Trends**
   - Robotics enable rapid adaptation to emerging agricultural trends, such as regenerative agriculture and the shift to high-value specialty crops.

Risks and Challenges

1. **Cost and Accessibility**
   - High upfront costs of robotic systems can limit adoption, particularly for small and medium-sized farms.
   - Limited access to financing and a lack of scalable solutions exacerbate disparities in technology adoption.
   - CEMA can collaborate with policy makers to design targeted financial incentives, scalable business models, and funding schemes that lower the entry barriers for small and medium-sized farms to adopt agricultural robotics.
2. **Technical and Operational Barriers**
   - Integration of robotic systems with existing machinery and farming practices - fleet management and digital platforms remains a challenge.
   - Ensuring interoperability and developing industry standards on data exchange in relation to mixed fleet operations are critical needs.
   - CEMA can lead industry efforts to develop and promote open standards for interoperability, fleet management, and digital platforms, ensuring seamless integration of robotic systems with existing farm machinery and practices.
3. **Regulatory and Safety Concerns**
   - The regulatory framework for autonomous machinery, including liability and safety, does exist with the Machinery Regulation and the Product Liability Directive but the technical standards in support of adequate risk assessment by manufacturers are still under development.
   - For other regulations recently published (in particular safety of Machinery), concerns of public authorities on the way to prove the safety of autonomous robots in shared farm environments: push to use any alternative way to imposing third party validation.
   - The publication of the AI Regulation, which highlights the notion of high-risk AI, will have impact on some systems used on agricultural robots. This might restrict innovation and quick development of technical solutions for agricultural robots.
   - CEMA can provide expert input and technical guidance to accelerate the development of harmonized technical standards and practical risk assessment methodologies, while advocating for balanced regulatory approaches that safeguard innovation in agricultural robotics.
4. **Lack of Awareness and Expertise**
   - Farmers often lack the knowledge and skills required to operate and maintain robotic systems effectively. The trainings will need updates in the coming years to consider these new technologies.

    - Greater emphasis is needed on training and capacity building for end-users.
    - The members of CEMA can partner with educational institutions and extension services to deliver up-to-date training programs and awareness campaigns that equip farmers with the knowledge and skills needed to operate and maintain robotic systems.
5. **Data Governance and Cybersecurity**
    - Any smart automated connected machinery generates vast amounts of data, with harmonised solutions to be found on data rights and rules (based on the data act), privacy (integration of the GDPR), and cybersecurity (CRA).
    - A robust framework for data (services) sharing and data governance is essential to build trust and encourage adoption.
    - CEMA can work with policy makers and stakeholders to establish clear, harmonized frameworks for data sharing, rights, privacy, and cybersecurity, fostering trust and secure adoption of connected agricultural machinery.

Recommendations for Policymakers

Agricultural robots represent a transformative opportunity for the agricultural machinery industry and the broader farming community. While significant benefits can be realized, addressing the associated risks and barriers is essential. Policymakers and industry stakeholders must work collaboratively to create an enabling environment for the adoption of these technologies, ensuring that they contribute to a sustainable, productive, and resilient agricultural future.

CEMA calls on EU policymakers to:

1. **Strengthen Regulatory Frameworks**
    - Support the development of harmonized standards in relation to safety and security of autonomous machinery by facilitating consultations with industry stakeholders, technical bodies, and Member States to ensure that the development of harmonized standards is inclusive, practical, and keeps pace with technological innovation.
    - Continue investing in and supporting the creation of a robust data sharing and governance framework to unlock the full potential of autonomous machinery. This will facilitate secure, interoperable data exchange, driving innovation and accelerating the adoption of autonomous technologies across Europe. Be cautious as policy maker that the regulatory framework does not become a bottleneck itself for small volumes and fast changing innovative solutions: need for lean regulations / procedures.
    - Address liability issues and ensure clarity in regulatory standards to facilitate market entry.
2. **Support Research and Development**
    - Increase funding for innovation in agricultural robotics through EU programs like Horizon Europe and future FP10.
    - Encourage collaboration between industry, academia, and farmers to develop user-centric solutions by facilitating future farm programmes aimed on knowledge exchange and demonstrations in real life environment.

3. **Facilitate Adoption and Scale-Up**
    - Provide financial incentives, such as subsidies and tax breaks, for the purchase and deployment of robotic systems.
    - Support small and medium-sized farms with tailored financing options and cooperative purchasing models.
4. **Promote Education and Training**
    - Invest in training programs for farmers and technicians to build expertise in robotic technologies and autonomous vehicles.
    - Promote demonstration farms concept to showcase best practices and build confidence among potential adopters to understand how robotic technologies will engage with and enhance agronomic/farming practices.
5. **Enhance Data Governance**
    - Develop clear policies on data ownership, sharing, and security to protect farmers' interests and promote transparency.
    - Drive the implementation of open data standards to achieve interoperability and seamless integration.

Looking ahead, it is expected that there will be growth in achieving maturity, in absolute figures and the integration in the fleet[4]. The next decade will likely see advancements in AI, connectivity, and energy-efficient systems, further enhancing the capabilities of autonomous machinery. The integration of robotics with digital agriculture platforms and the development of interoperable standards will be critical for seamless operations across mixed fleets.

As the agricultural machinery industry continues to innovate, CEMA remains a key advocate for policies and initiatives that support the adoption of these groundbreaking technologies, ensuring a competitive and sustainable future for European agriculture.

ABOUT CEMA

CEMA aisbl (www.cema-agri.org) is the association representing the European agricultural machinery industry. With 11 national member associations, the CEMA network represents both large multinational companies and numerous European SMEs active in the sector.
CEMA represents about 1,300 manufacturers, producing more than 450 different types of machines with an annual turnover of about €40 billion and 150,000 direct employees. CEMA companies produce a large range of machines that cover any activity in the field from seeding to harvesting, as well as equipment for livestock management.

[4] https://www.gminsights.com/industry-analysis/autonomous-agricultural-vehicle-market