# AI-powered innovations accelerate sustainable farming to tackle global hunger



The landscape of agriculture is undergoing a transformative shift, driven by advancements in artificial intelligence (AI) that hold promise for enhancing food security and addressing global hunger. As the climate crisis intensifies and resources become increasingly scarce, solutions are being sought to ensure sustainable food production systems. The United Nations has set an ambitious goal to end hunger worldwide by 2030, and innovative technologies could play a pivotal role in achieving this aim.

In various corners of the world, farmers are already harnessing AI-driven tools to combat pressing agricultural challenges. In Cameroon, for instance, Adamou Nchange Kouotou has introduced an AI-supported app that empowers farmers to assess the health of their crops. By identifying pests and diseases through image recognition, the app provides tailored advice that directly supports smallholders dealing with degraded soils, particularly in sub-Saharan regions. This direct assistance is crucial for enhancing small-scale farmers' livelihoods and promoting food security.

Meanwhile, in southern Spain—often referred to as Europe's vegetable garden—Joaquín Soriano Fernandez employs sensor technology to optimise conditions in greenhouses. His system adjusts temperature and humidity levels based on real-time data, enabling water-saving irrigation methods that are vital for drought-stricken areas. This integration of AI not only conserves water but also supports the broader agricultural framework by increasing efficiency and productivity.

The potential of AI extends beyond crop monitoring to include innovative harvesting techniques. In Madrid, engineer Roemi Fernandez Saavedra is at the forefront of developing robotic harvesters that can discern ripe produce, such as tomatoes and eggplants, thus reducing labour costs and addressing issues associated with under-resourced human labour in agriculture. These advancements aim not only to enhance productivity but also to alleviate the often challenging working conditions faced by many agricultural workers.

Food waste remains a significant issue globally, with Germany alone discarding approximately eleven million tons of food annually. A notable portion of this waste arises from restaurants and canteens. In Lünen, a company canteen has adopted an AI forecasting system designed to predict lunch demand accurately, thereby minimising excess food production. Such innovations are critical as they contribute not only to economic savings but also to an environmentally sustainable approach to food management.

Despite these promising developments, the integration of AI in agriculture is fraught with ethical considerations. Issues such as data privacy, the energy demands associated with AI technologies, and the impact on traditional farming practices must be carefully navigated. As highlighted in discussions by various experts, balancing technological benefits with ethical responsibilities is essential for achieving the long-term goals of sustainability and equity in agricultural practices.

Furthermore, AI is revolutionising farming through various methodologies, including predictive analytics, precise irrigation systems, and comprehensive resource management. Applications like crop health monitoring and intelligent pest management are increasingly being adopted to increase yields and ensure efficient resource usage. For instance, machine learning algorithms are used to analyse weather patterns, soil conditions, and crop health, thereby enabling farmers to make informed decisions that significantly impact their harvests.

Overall, while the challenges posed by climate change and resource scarcity are considerable, the burgeoning field of AI presents various opportunities for reshaping agricultural practices. With correct implementation, these technologies can lead to significant advancements in food security, environmental sustainability, and economic viability for farmers across the globe. As the agricultural sector embraces these changes, the success of AI in addressing world hunger may hinge on thoughtful approaches that prioritise both human and ecological well-being.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.dw.com/en/artificial-intelligence-in-agriculture-fighting-world-hunger/a-72453799), [[2]](https://www.ft.com/content/33ed8ad0-f8ad-42ed-983a-54d5b9eb2d27)
* Paragraph 2 – [[1]](https://www.dw.com/en/artificial-intelligence-in-agriculture-fighting-world-hunger/a-72453799), [[3]](https://techsense.lu/news/transforming-agriculture-7-applications-of-ai-revolutionizing-farming-practices), [[4]](https://ankipanki.com/ai-in-agriculture-2023/)
* Paragraph 3 – [[1]](https://www.dw.com/en/artificial-intelligence-in-agriculture-fighting-world-hunger/a-72453799), [[5]](https://waterforfood.nebraska.edu/news-and-events/news/2023/06/ai-in-agriculture---how-its-revolutionizing-the-industry)
* Paragraph 4 – [[1]](https://www.dw.com/en/artificial-intelligence-in-agriculture-fighting-world-hunger/a-72453799), [[6]](https://www.researchgate.net/publication/376457780_Artificial_Intelligence_in_Agriculture_The_Potential_for_Efficiency_and_Sustainability_With_Ethical_Considerations)
* Paragraph 5 – [[2]](https://www.ft.com/content/33ed8ad0-f8ad-42ed-983a-54d5b9eb2d27), [[7]](https://www.startus-insights.com/innovators-guide/ai-in-agriculture-strategic-guide/)

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## Bibliography

1. <https://www.dw.com/en/artificial-intelligence-in-agriculture-fighting-world-hunger/a-72453799> - Please view link - unable to able to access data
2. <https://www.ft.com/content/33ed8ad0-f8ad-42ed-983a-54d5b9eb2d27> - This article discusses how next-generation artificial intelligence (AI) can be harnessed to foster societal improvements, focusing on agriculture, healthcare, and environmental conservation. In agriculture, AI enhances precision farming, guides resource management, and improves yields using predictive models and smart technology. The report highlights the ethical considerations and the need to manage growing energy demands from AI, advocating for tailored small language models (SLMs) for specific purposes. Overall, while AI presents vast opportunities for societal benefits, careful implementation and balancing human elements are crucial for success.
3. <https://techsense.lu/news/transforming-agriculture-7-applications-of-ai-revolutionizing-farming-practices> - This article explores seven ways AI is revolutionising farming practices: precision farming, crop monitoring and disease detection, autonomous farming machinery, predictive analytics for yield forecasting, smart irrigation systems, supply chain optimisation, and livestock monitoring and management. It discusses how AI technologies like sensors, drones, and machine learning algorithms are being used to optimise resource usage, monitor crop health, and improve overall efficiency in agriculture, leading to increased productivity and sustainability.
4. <https://ankipanki.com/ai-in-agriculture-2023/> - This article provides an overview of AI applications in agriculture, including crop monitoring and disease detection, irrigation and water management, predictive analytics for yield optimisation, AI-enabled crop protection, AI-enhanced supply chain management, and harvesting and sorting robots. It discusses how AI technologies are being used to monitor crops, optimise water usage, predict yields, manage pests, and improve overall efficiency in agriculture, leading to increased productivity and sustainability.
5. <https://waterforfood.nebraska.edu/news-and-events/news/2023/06/ai-in-agriculture---how-its-revolutionizing-the-industry> - This article discusses how AI is revolutionising agriculture by providing predictive analytics, crop and soil health monitoring, weather prediction, irrigation management, and intelligent spraying. It explains how AI algorithms analyse data from various sources to help farmers make informed decisions, optimise resource usage, and improve crop yields, leading to more sustainable and efficient farming practices.
6. <https://www.researchgate.net/publication/376457780_Artificial_Intelligence_in_Agriculture_The_Potential_for_Efficiency_and_Sustainability_With_Ethical_Considerations> - This research paper examines the potential of artificial intelligence (AI) in agriculture to enhance efficiency and sustainability, while also addressing ethical considerations. It discusses how AI can assist with investigating soil health, monitoring weather patterns, and advising on the use of fertiliser and pesticides. The paper highlights the importance of farm management software in increasing production and profitability, empowering farmers to make better choices across the entire crop-growing process.
7. <https://www.startus-insights.com/innovators-guide/ai-in-agriculture-strategic-guide/> - This strategic guide explores the applications of artificial intelligence (AI) in agriculture, focusing on pest and disease management. It discusses how AI-powered image recognition systems analyse visual data from crops to identify early signs of pest infestations and diseases. The guide highlights the integration of AI into integrated pest management (IPM) systems, enhancing the ability to predict and prevent pest outbreaks, and the use of AI-based drones equipped with imaging sensors to detect early disease symptoms in crops.