Int. J. Agriworld, Vol. 6[2] August 2025

Online ISSN: 2582-7537
Journal's URL:http://www.svpss.in/ijaw
DOI: https://doi.org/10.51470/IJAW.2025.06.02.18
Received 17.06.2025 Revised 20.07.2025 Accepted 10.08.2025
REVIEW ARTICLE **OPEN ACCESS**

Technology Driven Sustainable Reshaping of Dairy, Food and Agriculture Sectors: A Review

Bhopal Singh[1], Karan Kumar Varun[1], Rekha Rani[2*] and Ajay Singh[3]
[1]Department of Agriculture Science, Dayalbagh Educational Institute, Agra, Uttar Pradesh-282005
[2]College of Dairy and Food Technology, Agriculture University, Jodhpur, Rajasthan-344001
[3]Department of Food Technology, Mata Gujri College, Fatehgarh Sahib, Punjab, India-140406
***Corresponding E. mail:** rekhacdft@gmail.com

Abstract

Dairy along with its related foods, as well as agricultural activities, are the chief source of income for almost 50% of people, especially those who live in villages. The raw material from the farm is directly supplied to industries for conversion into value-based goods. There are many thermal as well as non-thermal techniques available to make the work more efficient and also convert traditional knowledge with modern innovations and advancements. Presently, it emphasis automation in the dairy, food, and agriculture sectors for enhancing efficiency, quality control, and safety of food production with the use of robotics, artificial intelligence (AI), and nanotechnology while addressing the strains and challenges for the implementation of these technologies, particularly in underdeveloped and developing regions like India. Furthermore, the review also focuses on the digital technology's potency for enhanced sustainability goals through the supply chain optimizations, food safety enhancements, and shelf-life extension of the products through innovative packaging solutions. Although the challenges continue, integration of such technologies offers promising paths to create a comparatively more sustainable and equitable environmental system, focusing on the time- and cost-saving research, development, and innovation in these areas.

Keywords: Sustainability, Economy, Innovations, Robots and Nanotechnology.

Introduction

Sustainability is the act of supporting a process without depleting the resources over time; it can be achieved through improving the work pattern, changing habits of lifestyle, innovations through research, reducing the pollution and pollutants, especially plastics, and incorporating and combining the traditional knowledge, system, and practices as well as thoughts with recent technologies (Ruschitskaaya *et al.*, 2024). Food is the main source of energy as well as a basic need of all the people for survival in the cosmos. Along with this, milk and milk products are popular everywhere due to their uniqueness and good nutritional value. Dairy, food, and agriculture sectors are the backbone of the Indian economy because more than 50% of the population depends on these sectors as the source of earnings. Moreover, they contribute about 22% to the GDP of India. Even in the COVID-19 era, these sectors play an important role in maintaining the economy along with livelihood at the global level (Singh and Rani, 2024). Day-by-day changes in the climatic pattern along with depletion of resources are the two main challenges for the newer and cost-efficient technologies. Advancement in science, innovative solutions in combating environmental issues, transforming industries, and reshaping lifestyles have become the requisites for a sustainable future (Jaraweh *et al.*, 2023). Ohmic heating (OH), pulsed electric field (PEF), infrared radiation (near, mid, and far), microwave, ultrasound, pasteurisation, homogenisation, hurdle technique, high hydrostatic pressure (HHP), sterilisation, ultrahigh temperature treatment (UHT), ozonisation, carboxylation, packaging (edible, active, modified, and controlled atmospheric), filtration (micro, ultra, nano, reverse osmosis, diafiltration, and electrodialysis), spun fibre technology (SPT), extrusion, hydroponics, greenhouse

technology, etc. are some of the most commonly used thermal and non-thermal techniques in the dairy, food, and agricultural sectors (Rani *et al.,* 2019; Hill, 2024; Abd *et al.,* 2025). However, researchers are focusing on some newer techniques along with making the older technologies more user-friendly, time-saving, cost-effective, and easily available for everyone. This review article delves into some of the most recent technologies concerning the dairy, food, and agriculture sectors (robotics, nano, and digital technologies) driving sustainability along with the possibility to generate a greener and more equitable environment throughout the globe.

1. Robotics:

Robotics is among the most fascinating concepts useful in the dairy and food industries to raise work efficiency, cut down the cost and the number of labourers, improve good manufacturing practices, increase hygiene as well as laboratory practices (GMP, GHP, GLP), diminish quality issues, reduce the demand for vehicles for transport, enhance safety in all processing steps, and cater to the boosting of food choice and demand (Henchion *et al.,* 2022). Automation or mechanization in the dairy industry has changed the way of milk production and processing, improving the milk and milk products lineaments, including lifestyle of milch animals. A robot is an electromechanical device (human or animal shaped) that is well programmed to take commands like a computer (Alam *et al.,* 2025). In general, robotics is a technology in which robots work as per the instructions or command given, with immediate action to complete the task without self-thinking capability. Its efficiency and speed can be controlled or depend on the processors or sensors installed in it (Alam *et al.,* 2025). The present era is marked by the use of this advanced featured technology. Many hotels and food industries are using this technology worldwide, but in India it is in the developing phase due to the high availability of low-cost labour as well as lack of knowledge along with, most often, some religious issues. There may be some difficulties in this process, including lack of suitable or highly efficient sensors and software, low profit margins, and batch and/or continuous operations demand, along with equipment initiation not used in these processes (Hailu, 2023).

Challenges and their prevention in robotics:

Some of the major challenges in this technology are

- Differences in the design, morphology, weight, and position of the studied object so that the normal robot or old sensors cannot complete the given task; hence, intelligent sensors and the latest version of software are required.
- The handling Objects are most likely fragile and covered by viscous and slippery materials due to which proper care becomes an issue while working at high speed.
- Consumer safety, quality control and hygienic are main issues for human health.
- These challenges have been modernized in the latest version of robotic machines. Among food and dairy sector most of the systems are either insulated or batch-type operation handling targets particular jobs. To make mechanization successful, these should be introduced into all things considered in the manufacturing process, providing continuous online control capability. However, this pattern is now more dynamic due to the high rate of automation in dairy operations (Espinoza-Sandoval *et al.,* 2024).

Robotics for Quality Control in agriculture and allied sectors

The dairy and food industries are extremely competitive production units but share relatively small robotic participation compared to the automotive industry since there is large variability in their size, shapes, and conformation posing prime difficulty to derivate individual dealing techniques (Patel, 2023). Commercially, robots are widely used at the last stage of most of the working lines in these industries, like grading, packaging of food products, their transportation, palletizing, handling hot trays in meat, dairy, and baking units, *etc*. The ranking robot system had made several outcomes, such as labour replacement and human bias free automated evaluation mechanism (Alam *et al.,* 2025). A fruit harvesting robot had been developed for data accumulation and traceability to guide farmers and producers in Japan's precision farming system, that generally use green house and small fields for crop production, with an end-processing for the fragile and delicate mushrooms reaping (Kaleem *et al.,* 2023). An evaluation technique through robots had been introduced to harvest deciduous fruits e.g. apples, peaches and pears. The developed technique picks up the fruit automatically from large vessels and checks the fruits from all sides (Kaleem *et al.,* 2023).

India's first mechanized dairy plant (1,000,000 liters per day milk handling capability) had been established at Gandhinagar, Ahmedabad (Gujarat), and they may use robotics in the future for increasing its efficiency. Dairy and food manufacturing

units are more labour-intensive, as in some cases the labour cost is estimated to be more than 50% of the value of the prepared item. Reduced labour cost and enhanced productivity would thus create substantial hit on net productivity and profitability (Meshram *et al.,* 2018).

According to the statistics of the International Federation of Robotics (IFR), 178,132 industrial robots had been traded globally in year 2013, in which 3.5% were only from the culinary and brewing industry (DLG-Expert report, 2015). In 2015, 240,000 robots were sold, revealing their 8% annul universal growth. Approximately 1.3 million new industrial robots have been supposed to be deployed during 2015-2018. The data reveals the extent of usage of robots with the progression of time. Food, dairy and other related units use robots for numerous uses to enhance the potential and reduce the work area (Zongwei, 2015) along with their cost-effectiveness. Food processing sectors recorded a 25% increase in productivity using robots. However, the rate of performance changes in separate food sectors. Recently, various types of robots had been put into functioning for different aspects in food industries (Prasad, 2017). Originally the use of robots was confined to food packaging and palletizing in most of the industries including dairy, brewing and food industries. The 'Flex Picker' (a robot) 1998 put a revolution in the food sector being the world's fastest pick-and-place robot at the first place. These pickers always demonstrate clear selections for expertly-validated, quality assured products (Prasad, 2017). 'SCARA' (selective compliance assembly robot arm) robots for pick and place along with 'spider' robots used for rapid selection and positioning light weight objects are some of the examples of commercial robots popular in various industries. SCARA are stationary or horizontally localized projecting robots having similar movements as that of human hand. They have proved perfectly suitable for the automated operations due to their efficient and continuous reliable packaging, palletizing, cargo handling. 'Delta' or parallel link robotics are used in modern-day robotics and engineered for rapid performance of lightweight products and require less maintenance through the elimination of intricate wiring and avoiding multi-axis configurations. Line to line robotic techniques are developed in some of the food manufacturing practices. These provide faster rate for transferring food products, both packed and loose, through manufacturer lines (Weijie and Lihong, 2019).

Emerging hurdles and growth prospects of research and development (R&D) in robotics

Nowadays, the Cyber Physical System (CPS) concept is applied in dairy as well as food and agricultural sectors. For connecting the universe to the visible, Cyber Physical System is a multidisciplinary approach domain that works on the basics of the Internet of Things (IoT), discovering possible ways to streamline the end-to-end supply chain in the dairy and food processing sectors. The CPS concept can be applied to accomplish a broad state for surety in safe food procedures (Smetana *et al.,* 2020). It can be used in the agricultural sector for substantial strike in the time ahead. In the broader strategic timeline, manufacturing cum supply chains bears evidence of the act of 'intelligent food labeling system' providing in-depth perception for the origin of food (Cui, 2021). Moreover, future CPS will be beneficial using cloud robotic systems in agricultural sectors.

2. Digital Technologies for Sustainability

At present, digitalization and sustainability are the best themes for practitioners and policymakers. Researchers are working on their fundamental interaction and have been attentive in their positiveness. Though all digitalization does not contribute for the formation of sustainable measure, many times digitalization hastens expenditure and differences aggravating development practices which could promote the biophysical limits (Gebresenbet *et al.,* 2023). The German Advisory Council on Global Change discourages about the risk of upcoming digital technology time in their cover report (WBGU, 2019), although the Rome Club advocated that president of the European Union must ensure the exponential application, digitalization, and AI optimization for the planet's sustainability and prosperity through low-carbon content and a socially just, well-orientated circular society in an open letter (Kulkov *et al.,* 2024). Historically, although a triple lens perspective had been applied to view sustainability *(i.e.,* economic, environmental and social sustainability). With the aid of the digitalization some of the world's most pressing environmental problems can be solved efficiently and easily, e.g. reduction in global greenhouse affects resource diminution and immiserization. Smart and efficient algorithms, interconnected gimmicks and big data aid in the acknowledgment of supply chains, integrating resources- and maximizing energy efficiencies, and accelerate the dispersal of innovative cum sustainable solutions (Xu *et al.,* 2024). Even though, digitally integrated work styles, pervasive e-

business, and the shared economic system raising new difficulties casting uncertain sustainability measures made through digital economy, i.e., enhanced energy consumption and unequal resource utilization for hardware production (Limpamont *et al.,* 2024).

Challenges and the Road Ahead

While technology offers immense potential for a sustainable future, challenges remain. High initial costs, lack of infrastructure, and societal resistance hinder its widespread adoption. Additionally, ethical concerns about certain technologies, such as climate engineering and AI, require robust governance frameworks (Limpamont *et al.,* 2024). However, by fostering innovation, encouraging public-private partnerships, and promoting education and awareness, we can leverage technology to create a future where economic growth harmonises with environmental stewardship (Cheng *et al.,* 2023).

3. Nanotechnology (NT)

It is defined as the stream of science and technology related to planning, production, and their applications in blueprint construction, techniques, and conditions controlled at the sub-molecular and particle level, possessing at least a single element of 100 nm (1.0 × 10-8 millimeters) or less. Nowadays it is used at nuclear, subatomic and supramolecular scale and primarily centers on the Nano-sized materials, devices and processes (Andres-Seijo *et al.,* 2024). In the field dairy, food and agriculture, nanotechnology comes up with important applications, includes advance packaging solutions, nano-particulate transfer systems, ensuring food & dairy safety and increasing biosecurity measures (Kiran *et al.,* 2024; Kumarmath, 2024). Different kinds of Nano-devices could be fortified into edible items to enclose latest functionalities, such as nanoparticles, Nano-liposomes and Nano-emulsions. Unique characteristics of nanoparticles provide opportunities for research and innovation in dairy and other related sectors (Perumal *et al.,* 2019). Recently, NT is being used in the packaging industry, equipment design, and different substances, hence performing a crucial role in transmuting various industrial prospects (Sahoo *et al.,* 2021). Additionally, nanotechnology is revolutionizing plant hygiene with precise disease management, pathogen detection aiding environmental safety across various systems. Plays a significant role in enhancing overall hygiene practices, particularly in plant sanitization (Mohammad *et al.,* 2022). It can be used in bioactive compounds, functional and nutraceutical preparations, as well as pharmaceuticals (Aguilar-Pérez *et al.,* 2023). The shelf life of a food item is significantly impacted by nature of product and its formulation process, the type of packaging and material properties, processing conditions, storage, and dissemination techniques (Balasubramanian *et al.,* 2023). Microbiological contamination is common on the outer food surface, admitting oily and other related products. Thus, biodegradable packaging demonstrates to be a useful tool for prolonging life expectancy of various edible products. The integration of NT into the dairy as well as various food industries is thought to integrate a breakthrough change. Nano-devices are used in preparation of ultra-edge quality as well as protected and trustable dairy and food items, and in the making of newer packaging materials with substantially better barrier calibres (Malik *et al.,* 2023).

Nanomaterial

Nano-materials can be prepared following two fundamental techniques: the top-down and the bottom-up approaches (Alsaiari *et al.,* 2023). The "hierarchical strategy" includes changing Nano-scale materials with the help of sketching, lithography and treating cycles (Mohammad *et al.,* 2022). Self-gathering and/or self-association are captivating modern thoughts which modernizes food NT on a top degree.

Classification patterns for Nano-materials in milk Industry

Different types of Nano-formulations are utilized in the dairy sector for different intensions. These Nano-formulations are marketed in either in the form of solutions or the powder form, excreting different (chemical and physical) properties at the Nano-size equated to their micron sized competitors having identical chemical compositions. The nanomaterial's can be categories on the basis of their particle size, configurations and characteristics. This categorization results in categories such as Nano-capsules, Nano-clays and nanoparticle *etc.* (Alsaiari *et al.,* 2023).

Conclusion

The addition of robotics in food and dairy technology marks a move towards extra efficient, sustainable, and hygienic produce. Whereas the challenges are remaining, continuous advancements in artificial intelligence (AI) and robotics combined with supportive rules and funds are paving the way for their extensive adsorption. By addressing world food consumption and encouraging sustainability, robotics has the probability to transform the technique we develop, process, and certify, protecting a healthy upcoming future for all. Robotics, artificial intelligence, and nanotechnology are playing an

important role in food and dairy industries, addressing challenges in safety, quality, and sustainability. Although worries about the security, safety, and costs continue, current study and novelty promise to solve its occupied potential, following rules, regulations, and purchaser instructions. Nanotechnology can meaningfully contribute to developing a healthier, improved, and extra sustainable world food system. The addition of AI and nanotechnology is used to redefine the food and dairy manufacturing companies, contributing solutions for quality, safety, and sustainability. Thus, emerging techniques and ongoing research on the development of new and cost-effective technologies will be better for providing sustainability.

REFERENCE

Abd Rahman, N.S., Arifin, K., and Aiyub, K. (2025) Systematic Literature Review on New Technologies in Agriculture: Present and Future. *Paper Asia*, 41(1), 168–183. https://doi.org/10.59953/paperasia.v41i1b.344

Aguilar-Pérez, K.M., Ruiz-Pulido, G., Medina, D.I., Parra-Saldivar, R., and Iqbal, H.M. (2023) Insight of nanotechnological processing for nano-fortified functional foods and nutraceutical—opportunities, challenges, and future scope in food for better health. *Critical Reviews in Food Science and Nutrition*, 63(20), 4618-4635.

Alam, M.W., Kumar, J.V., Awad, M., Saravanan, P., Al-Sowayan, N.S., Rosaiah, P., and Nivetha, M.S. (2025) Emerging Trends in Food Process Engineering: Integrating Sensing Technologies for Health, Sustainability, and Consumer Preferences. *Journal of Food Process Engineering*, 48(1). *John Wiley and Sons Inc*. https://doi.org/10.1111/jfpe.70035

Alsaiari, N.S., Alzahrani, F.M., Amari, A., Osman, H., Harharah, H.N., Elboughdiri, N., and Tahoon, M.A. (2023) Plant and Microbial Approaches as Green Methods for the Synthesis of Nanomaterials: Synthesis, Applications, and Future Perspectives. *Molecules*, 28(1) MDPI. https://doi.org/10.3390/molecules28010463

Balasubramaniam, V.M., Lee, J., and Serventi, L. (2023) Understanding new foods: Development of next generation of food processing, packaging, and ingredients technologies for clean label foods. *In Sustainable Food Innovation* (pp. 157-167). *Cham: Springer International Publishing*.

Cheng, C., Fu, J., Su, H., and Ren, L. (2023) Recent Advancements in Agriculture Robots: Benefits and Challenges. *Machines* 11 (1). Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/machines11010048

Cui, X. (2021) Cyber-Physical System (CPS) architecture for real-time water sustainability management in manufacturing industry. Procedia CIRP, 99, 543–548. https://doi.org/10.1016/j.procir.2021.03.074

DLG-Expert report (2015) Robots in the food industry. DLG. Retrieved from www.dlg.org/fileadmin/ downloads/food/DLG_Flyer_Image_EW_2015.

Espinoza-Sandoval, O.R., Angeles-Hernandez, J.C., Gonzalez-Ronquillo, M., Ghavipanje, N., Zhang, N., Bayat, A.R., Hervás, G., Kholif, A.E., Mele, M., Loor, J.J., Stergiadis, S., and Vargas-Bello-Pérez, E. (2024) Dairy farming in the era of artificial intelligence: trend or a real game changer? *Journal of Dairy Research*, 91(2), 139–145. https://doi.org/10.1017/S0022029924000426

Gebresenbet, G., Bosona, T., Patterson, D., Persson, H., Fischer, B., Mandaluniz, N., Chirici, G., Zacepins, A., Komasilovs, V., Pitulac, T. & Nasirahmadi, A. (2023) A concept for application of integrated digital technologies to enhance future smart agricultural systems. *Smart Agricultural Technology*, 5, 100255. https://doi.org/10.1016/j.atech.2023.100255

Hailu, G. (2023) Reflections on technological progress in the agri-food industry: Past, present, and future. *Canadian Journal of Agricultural Economics*, 71(1), 119–141. https://doi.org/10.1111/cjag.12325

Henchion, M.M., Regan, Á., Beecher, M., and Mackenwalsh, Á. (2022) Developing 'Smart' Dairy Farming Responsive to Farmers and Consumer-Citizens: A Review. Animals, 12(3). *Multidisciplinary Digital Publishing Institute* (MDPI). https://doi.org/10.3390/ani12030360

Hill J. (2024) Science, technology, and innovation in the dairy sector. *International Journal of Food Science and Technology*, 59 (9), 6717–6723.

Jaraweh Y, Fatima S, Jarrah M, and AlZu'bi S. (2023) Smart and sustainable agriculture: Fundamentals, enabling. Computers and Electrical Engineering, 110. https://doi.org/10.1016/j.compeleceng.2023.108799

Kaleem, A., Hussain, S., Aqib, M., Cheema, M. J.M., Saleem, S.R., and Farooq, U. (2023) Development Challenges of Fruit-Harvesting Robotic Arms: A Critical Review. Agri Engineering 5(4), 2216–2237. Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/agriengineering5040136

Kiran, V., Harini, K., Thirumalai, A., Girigoswami, K., and Girigoswami, A. (2024) Nanotechnology's Role in Ensuring Food Safety and Security. *Biocatalysis and Agricultural Biotechnology*, 58, 103220. https://doi.org/10.1016/j.bcab.2024.103220

Kulkov, I., Kulkova, J., Rohrbeck, R., Menvielle, L., Kaartemo, V., and Makkonen, H. (2024) Artificial intelligence - driven sustainable development: Examining organizational, technical, and processing approaches to achieving global goals. Sustainable Development, 32(3), 2253–2267. https://doi.org/10.1002/sd.2773

Kumarmath, P.S. (2024) Nanotechnology in Food Industry. In: Yaradoddi, J.S., Meti, B.S., Mudgulkar, S.B., Agsar, D. (Eds) *Frontiers in Food Biotechnology*. *Springer Singapore.* https://doi.org/10.1007/978-981-97-3261-6_11 *Singapore: Springer Nature Singapore*.

Limpamont, A., Kittipanya-ngam, P., Chindasombatcharoen, N., and Cavite, H. J.M. (2024) Towards agri-food industry sustainability: Addressing agricultural technology adoption challenges through innovation. *Business Strategy and the Environment*, 33(7), 7352–7367. https://doi.org/10.1002/bse.3871

Malik, S., Muhammad, K., and Waheed, Y. (2023) Nanotechnology: A Revolution in Modern Industry. Molecules, 28(2). Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/molecules28020661

Meshram, B.D., Adil, S., and Ranvir, S. (2018) Robotics: An emerging technology in dairy and food industry. IJCS, 6(2), 440-449.

Mohammad, Z.H., Ahmad, F., Ibrahim, S.A., and Zaidi, S. (2022) Application of nanotechnology in different aspects of the food industry. *In Discover Food*, 2(1). *Springer Nature.* https://doi.org/10.1007/s44187-022-00013-9

Patel, H.M. (2023) The transformative role of artificial intelligence in modern agriculture. Review of Artificial Intelligence in Education, 4, e14e14. https://doi.org/10.37497/rev.artif.intell.educ.v4i00.14

Perumal, K., Ahmad, S., Mohd-Zahid, M.H., Wan Hanaffi, W.N., ZA, I., Six, J.L., Ferji, K., Jaafar, J., Boer, J.C., Plebanski, M. and Uskoković, V. (2021) Nanoparticles and gut microbiota in colorectal cancer. *Frontiers in Nanotechnology*, 3, p.681760.

Prasad, S. (2017) Application of robotics in dairy and food industries: a review. *International Journal of Science, Environment and Technology*, 6(3), 1856-1864.

Ruschitskaaya O, Kulikova E, Kot E, and Kruzhkova T. (2024). Sustainable practices and technological. E3S *Web of Conferences* 542, 030003. https://doi.org/10.1051/e3sconf/202454203003

Sahoo, M., Vishwakarma, S., Panigrahi, C., and Kumar, J. (2021) Nanotechnology: Current applications and future scope in food. *Food Frontiers*, 2(1), 3-22.

Singh, B, Hanslal and Rani, R (2019) Milk: Doubling the Income of Dairy Farmers. In: Recent Technologies in Dairy Science. Edited by Rekha Rani, Bhopal Singh, Chetan N Dharaiya, Hanslal and Arghya Mani. '*Today* and Tomorrow's Printers and Publishers, New Delhi, India. pp: 1-21.

Singh, B. and Rani, R. (2024) Effect of first and second wave of COVID-19 on dairy, food and agricultural sectors and economy of India. *Indian Farmer*, 11(11), 502-509.

Smetana, S., Aganovic, K., and Volker Heinz, and. (2020) Food Supply Chains as Cyber-Physical Systems: a Path for More Sustainable Personalized Nutrition. *Food Engineering Reviews*, 13(1), 92–103. https://doi.org/10.1007/s12393-020-09243-y/Published

WBGU (2019). Towards Our Common Digital Future, Berlin: WBGU, https://www.wbgu.de/fileadmin/user_upload/wbgu/publikationen/hauptgutachten/hg2019/pdf/WBGU_HGD2019_S.pdf, last accessed 02.11.2021.

Weijie, G., & Lihong, W. (2019). Design of Robots' Automatic Packaging and Palletizing. IOP Conference Series: Earth and Environmental Science, 242(3). https://doi.org/10.1088/17551315/242/3/032030

Xu, J., Li, Y., Zhang, M., and Zhang, S. (2024) Sustainable agriculture in the digital era: Past, present, and future trends by bibliometric analysis. In Heliyon, 10(14). Elsevier Ltd. https://doi.org/10.1016/j.heliyon.2024.e34612

Xu, J., Li, Y., Zhang, M., and Zhang, S. (2024). Sustainable agriculture in the digital era: Past, present, and future trends by bibliometric analysis. Heliyon 10(14).

Elsevier Ltd. https://doi.org/10.1016/j.heliyon.2024.e34612

Zongwei, L. (2015) Robotics, Automation, and Control in Industrial and Service Settings. *Hershey, PA, USA*: IGI Global.

CITATION OF THIS ARTICLE

Singh, B., Varun, K.K., Rani, R. and Singh, A. (2025) Technology Driven Sustainable Reshaping of Dairy, Food and Agriculture Sectors: A Review, *Int. J. Agriworld*, 6 [2]: 18-24.