



Modern Technologies in Poultry Production

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Poultry production is one of the fastest developing branches of animal agriculture. The demand for eggs and poultry meat is increasing because poultry products are nutritious, affordable and easy to produce on a commercial scale. Modern poultry farms are adopting scientific management, automation, digital monitoring and precision technologies to meet this demand. Modern technology in poultry production includes improved housing, controlled environment systems, sensors, artificial intelligence, automated feeding and watering, improved breeding, advanced hatchery systems, rapid disease diagnostics and efficient waste management. These technologies help farmers improve productivity, reduce losses and maintain better bird welfare. The main objective is to obtain maximum output from available resources while maintaining good health, biosecurity, environmental conditions and product quality. Technology also helps farmers make decisions using accurate farm data rather than relying only on visual observation.

Modern Poultry Housing

Modern poultry houses protect birds from extreme weather, predators and disease risks. Environmentally controlled houses maintain suitable temperature, humidity, ventilation and lighting according to bird age and production stage. Tunnel ventilation moves air through the house and removes heat, moisture and harmful gases. Evaporative cooling pads and fogging systems reduce heat stress during hot weather. Automatic curtains, fans and controllers adjust ventilation according to environmental conditions. Modern LED lighting systems use automatic timers and adjustable programmes. Proper light intensity and photoperiod support feed intake, growth, activity and egg production.

Automated Feeding and Drinking Systems

Automatic feeding systems use augers, chain feeders, hoppers and pans to distribute feed throughout the house. They save labour, provide uniform feed distribution and reduce feed wastage. Automatic nipple drinkers provide clean water and reduce contamination caused by open containers. Water meters and sensors can monitor consumption. A sudden change in water intake may indicate a management or health problem.

Precision Poultry Farming and Sensors

Precision poultry farming uses sensors and digital systems to continuously collect information from the flock and its environment. Sensors can measure temperature, humidity, carbon dioxide, ammonia, light intensity, feed intake and water consumption. Cameras and computer-vision systems monitor bird movement and activity. Changes in flock behaviour may provide early warning of heat stress, disease, injury or poor environmental conditions. Digital records also make comparison between houses and production cycles easier. Mobile applications and cloud-based farm-management systems allow farmers to receive alerts and view farm data remotely. This makes management faster and more accurate on large commercial farms.

Artificial Intelligence and Robotics

Artificial intelligence (AI) can analyse large quantities of data collected by sensors and cameras. Computer vision can assist in monitoring bird behaviour, activity and distribution. Robotic equipment can assist with inspection, litter management, egg collection and cleaning. Automation reduces repetitive manual work and can improve consistency. AI-based prediction tools may help estimate production performance and identify unusual patterns. These technologies require suitable infrastructure, skilled operators, reliable electricity and regular maintenance.

Modern Health Management and Biosecurity

Disease prevention is essential for profitable poultry production. Modern farms use strict biosecurity programmes, controlled entry, cleaning and disinfection, proper disposal of dead birds and separation of different age groups. Rapid diagnostic methods help identify infectious agents. Molecular techniques such as PCR can support detection of important pathogens. Modern vaccination programmes use improved vaccines and delivery methods. Digital health records can be combined with feed intake, water consumption, mortality and environmental data to identify abnormal changes early.

Modern Breeding and Genetics

Genetic improvement has greatly increased poultry productivity. Commercial broilers are selected for rapid growth, efficient feed conversion and desirable carcass traits, while layer strains are selected for high egg production and egg quality. Modern breeding programmes use performance records together with molecular and genomic information. Genomic selection and molecular markers can identify birds with desirable traits earlier. Selection for disease resistance, heat tolerance and efficiency is also important. Improved genetic stock must be combined with proper nutrition, housing and health management so that birds can express their genetic potential.

Modern Hatchery Technology

Modern hatcheries use computer-controlled incubators to maintain temperature, humidity, ventilation and egg turning. Automated systems improve consistency during incubation. Automated egg handling, grading and chick-processing equipment reduce labour and improve hygiene. Monitoring systems record incubation conditions and identify deviations. Data analysis can compare batches and identify factors affecting hatchability, helping managers improve incubation programmes.

Smart Egg Collection, Grading and Processing

Automatic egg collection systems transport eggs from laying houses to collection points, reducing breakage and labour requirements. Conveyor belts move eggs gently and continuously. Electronic grading systems classify eggs according to weight and quality. Modern packaging equipment improves hygiene, speed and consistency and helps maintain product quality.

Nutrition and Precision Feeding

Modern poultry nutrition uses balanced diets based on energy, protein, amino acids, minerals and vitamins. Precision feeding supplies nutrients according to bird age, body weight and production stage. Feed formulation software and laboratory analysis help optimize diets. Appropriate feed additives may improve nutrient utilization. Better nutrition can improve feed conversion, growth, egg production and flock uniformity.

Waste Management and Sustainable Production

Large poultry farms produce considerable quantities of manure and litter. Modern waste-management systems convert these materials into useful products while reducing environmental pollution. Poultry litter can be composted and used as organic fertilizer. Manure can also be used for biogas production under suitable conditions. Proper storage and

treatment reduce odour, nutrient losses and water contamination. Energy-efficient fans, LED lighting, insulation and solar power can reduce energy use. Water-saving drinkers and monitoring systems reduce wastage. Sustainable practices improve resource efficiency.

Internet of Things (IoT) in Poultry Farms

The Internet of Things connects sensors, controllers and farm equipment through digital networks. In a smart poultry house, sensors send data to a central system that can automatically control fans, cooling equipment, heaters, feeders and lighting. IoT systems provide real-time information through computers or mobile phones. Farmers can monitor multiple houses from one dashboard and receive alerts when environmental or production parameters move outside desired limits.

Benefits of Modern Technologies

Modern technologies can increase productivity, improve feed and water efficiency, reduce labour requirements and improve environmental control. Automation also enables regular and accurate monitoring. Early detection of health or environmental problems can reduce mortality and economic losses. Better biosecurity, controlled housing and improved hygiene contribute to healthier flocks and safer poultry products. Data-based management improves record keeping and helps farmers evaluate individual houses, batches and production cycles.

Challenges and Limitations

Advanced technologies require higher initial investment than conventional systems. Small and medium-sized farmers may find the cost of equipment and automation difficult to manage. Technology also requires skilled workers, reliable electricity, software support and regular maintenance. Equipment failure can affect production if backup systems are not available. Proper training and technical support are therefore essential.

Future Scope of Technology

The future of poultry production is expected to involve greater integration of artificial intelligence, robotics, IoT, computer vision, precision nutrition and genomic technologies. Smart systems may increasingly automate decisions about ventilation, feeding and environmental control. Advanced monitoring may provide more detailed information about bird behaviour and welfare. Predictive models may help farmers identify disease risks, forecast production and optimize resource use. Future poultry systems should combine productivity with animal welfare, biosecurity and environmental sustainability. Technology should be selected according to farm size, local climate, economic conditions and technical capacity.

Role of Technology in Improving Productivity

Technology affects almost every stage of poultry production, from breeding and hatchery management to feeding, health care, egg collection and waste utilization. Better environmental control reduces stress and helps birds express their genetic potential. Automated systems reduce human error and allow routine tasks to be completed consistently. Data analysis identifies trends in feed conversion, mortality, egg production and environmental conditions, allowing timely decisions.

Conclusion

Modern technologies are transforming poultry production into a more precise, automated and data-driven system. Controlled housing, automated feeding and watering, sensors, AI, robotics, improved genetics, advanced hatcheries, modern diagnostics and sustainable waste management can increase efficiency and reduce production losses.