Indian Farmer
Volume 12, Issue 08, 2025, Pp. 443-446
Available online at: www.indianfarmer.net
ISSN: 2394-1227 (Online)

Popular article

OPEN ACCESS

Flying High: Recent Trends in Poultry Breeding for a Better Tomorrow

Deesha Gupta and Nadiya Tariq

Division of Animal Genetics & Breeding, Faculty of Veterinary Sciences & Animal Husbandry, Shere-e-Kashmir University of Agricultural Sciences & Technology, Jammu, R.S. Pura - 181 102, Jammu & Kashmir, India

**Corresponding author: deeshagupta9@gmail.com*

Received: 02/07/2025 *Published:05/08/2025*

In the last few decades, the poultry industry has undergone a massive transformation—from backyard flocks raised for home consumption to a highly organized sector contributing significantly to nutrition, employment, and rural development. Today, poultry is not just a source of affordable animal protein; it is also a dynamic field where science, technology, and sustainability intersect. At the heart of this transformation lies poultry breeding—a discipline that is now being reshaped by emerging trends that prioritize productivity, adaptability, animal welfare, and environmental responsibility. As we enter a new era of food systems, understanding these trends in poultry breeding becomes essential not only for scientists and policymakers but also for farmers, entrepreneurs, and consumers.

From Classical to Genomic Selection: Speeding Up Genetic Progress

Traditionally, poultry breeding relied on selection based on visible traits such as egg production, body weight, or feed conversion efficiency. Over generations, these classical methods have delivered remarkable improvements, especially in commercial broiler and layer lines. However, in recent years, the integration of genomics has changed the game. By identifying genetic markers associated with economically important traits, breeders can now predict an individual bird's performance at a very early stage, even before traits are expressed. This technique, known as genomic selection, accelerates genetic gain and allows for more accurate selection, especially for complex traits like disease resistance, fertility, and heat tolerance (Wolc et al., 2016). In India, research institutions like the ICAR-Directorate of Poultry Research (DPR) are actively working on incorporating marker-assisted selection in native breeds such as Aseel and Kadaknath. These breeds are not only culturally significant but also possess traits like hardiness, flavor, and disease resilience—qualities that can be preserved and improved using modern genomic tools.

Breeding for Sustainability: The New Imperative

The poultry sector, while efficient, is increasingly under pressure to become more environmentally sustainable. With growing concerns about climate change, water use, and emissions, breeders are now focusing on traits that improve resource-use efficiency. One such area is feed efficiency—developing birds that can grow faster and lay more eggs with less feed. This not only lowers production costs for farmers but also reduces the environmental impact of poultry farming. In addition, there is increasing interest in low-input poultry systems, especially in rural and tribal India. Breeding programs are being designed to improve the performance of local, indigenous birds under free-range or backyard systems where access to formulated feed and veterinary care is limited. This aligns well with the goals of Atmanirbhar Bharat and women-led rural enterprises, where poultry can be a lifeline for income and nutrition (Sharma et al., 2020).

https://euimages.contentstack.com/v3/assets/blte5a51c2d28bbcc9c/blt9bd35ce87bbdd4d9/638f5784e36e740b71b64f1e/free-range-poultry-farm-GettyImages-179645905.jpg?width=1280&auto=webp&quality=80&format=jpg&disable=upscale

Health-Focused Breeding: The Battle Against Disease

Another major trend in poultry breeding is the selection for disease resistance, particularly in light of emerging diseases and reduced use of antibiotics. With growing restrictions on antimicrobial use, breeders are focusing on natural immunity and resilience in poultry. Researchers are using genomic tools, transcriptomics, and immunogenetics to identify genes associated with resistance to common diseases like Newcastle disease, infectious bursal disease, Marek's disease, and coccidiosis. Recent studies have identified toll-like receptor (TLR) gene variants and cytokine expression profiles that are linked to stronger immune responses in certain poultry breeds (Redmond et al., 2021). These findings are being incorporated into selective breeding programs to produce flocks that require fewer chemical interventions, reducing costs and promoting public health safety.

Breeding Beyond Meat and Eggs: Focus on Dual-Purpose and Specialty Birds

While commercial broilers and layers dominate the industry, there is a growing demand for dual-purpose and specialty poultry breeds. Consumers, especially in urban and peri-urban areas, are increasingly seeking free-range, organic, or native-breed poultry that aligns with health and ethical concerns. As a result, breeding programs are now targeting birds that perform reasonably well in both egg and meat production under non-intensive conditions. In India, the development of improved backyard poultry strains such as Vanaraja, Gramapriya, Kaveri, Srinidhi, and Kamrupa has empowered thousands of rural families. These birds are bred to thrive in backyard systems with minimal inputs, offering improved egg and meat yield while retaining native hardiness. The inclusion of Kadaknath, a black meat breed known for its medicinal value and market premium, into breeding programs is also gaining traction, reflecting consumer-driven selection trends (ICAR-DPR, 2022).

Digital Breeding and Data-Driven Decisions

With the rise of precision agriculture, poultry breeding too is embracing digital technologies. Data analytics, AI, and cloud computing are being used to manage breeding records, analyze genetic trends, and optimize selection decisions. Hatcheries and breeding companies are adopting cloud-based systems that integrate performance, health, and pedigree data across multiple flocks and geographies. This digital integration makes breeding more responsive, traceable, and predictive. Moreover, mobile apps are being developed to help smallholder farmers record poultry performance—such as egg laying, mortality, feed intake, and disease symptoms—thus enabling community-based breeding efforts even in remote villages. Such tools can democratize access to breeding knowledge and help identify and scale successful genetic lines in field conditions (Rashid et al., 2023).

Ethical and Welfare Considerations in Breeding

Recent trends in poultry breeding are not just about efficiency and output; there's a growing awareness around animal welfare and ethical breeding. Concerns over practices like fast-growing broilers with skeletal disorders, or high-laying layers with reproductive health issues, are prompting a re-evaluation of breeding goals. There is increasing pressure to breed birds with balanced traits, such as slower growth rates, improved bone strength, better cardiovascular health, and calm temperament. Globally, welfare-friendly breeding programs are being piloted in Europe and North America, and India is beginning to engage with this conversation. Welfare certification, ethical branding, and consumer education can all work together to promote responsible poultry breeding, while still being economically viable.

The Road Ahead: Integrating Science, Tradition, and Sustainability

In conclusion, poultry breeding is no longer confined to just producing more eggs or meat. It is evolving into a multi-dimensional science that encompasses genetics, environment, economics, health, and ethics. The convergence of modern genomics, digital technologies, and indigenous knowledge systems offers an exciting opportunity to build a more inclusive and sustainable poultry sector. Whether it's through disease-resistant native birds, low-input rural poultry systems, or AI-powered breeding algorithms, the future of poultry breeding is rich with possibilities. For a country like India, with its vast diversity in agro-climatic conditions and poultry-rearing traditions, the

challenge lies in ensuring that these innovations are accessible, adaptable, and aligned with local needs. Strong linkages between research institutions, policymakers, private hatcheries, and farmers will be key to ensuring that modern breeding trends translate into real-world benefits—better birds, better livelihoods, and better food systems.

REFERENCES

Wolc, A., et al. (2016). Genomic selection in commercial poultry breeding. *Animal Frontiers*, 6(1), 23–31.

Sharma, R.K., et al. (2020). Role of backyard poultry in rural India: Current status and future prospects. *Poultry Science Journal*, 58(2), 107–116.

Redmond, S.B., et al. (2021). Genomic tools for identifying disease resistance in poultry. *Veterinary Immunology and Immunopathology*, 234, 110216.

ICAR-DPR (2022). Annual Report 2021–22. ICAR-Directorate of Poultry Research, Hyderabad.

Rashid, M.I., et al. (2023). Digital transformation in poultry breeding and data integration for smallholder systems. *Asian Journal of Animal Sciences*, 17(1), 1–12.