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Tokbari: A dual-purpose crossbred bird for backyard poultry in north-eastern India

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Tokbari, *a promising cross-bred poultry bird developed by ICAR Research Complex for NEH Region Tripura Centre, represents a significant advancement for rural livelihoods in north-eastern India. This dual-purpose bird, comprising 25% Tripura Black, 25% Coloured Synthetic Female Line (CSFL), and 50% Dahlem Red genetic composition, demonstrates remarkable improvements in productive performance over native birds in terms of body weight and egg production. Since 2014, over 1.27 lakhs* Tokbari *germplasm have been distributed across north-eastern region validating its suitability for local agro-climatic conditions. The article describes its characteristics, advantages over native breeds and the management practices. It can significantly enhance rural income and nutritional security through improved productivity.*

Keywords: Backyard farming, Improved poultry birds, Nutritional security, Rural livelihood

BACKYARD poultry farming has been an integral component of rural livelihoods in India, especially in the north-eastern states. In this region, poultry farming serves as a crucial source of supplementary income and nutritional security for rural households. Most farmers in these regions traditionally rear local, non-descript birds that yield minimal outputs in terms of both egg production and meat. These indigenous birds typically produce only 50–70 eggs annually, with modest body weights averaging 1.0–1.5 kg at maturity. Despite increasing poultry population over the years, low productivity remains a major constraint limiting the economic potential of backyard poultry in the region.

The absence of location-specific poultry breeds has long been recognised as a significant barrier to improving rural poultry productivity. Recognising this gap, the ICAR Research Complex for NEH Region Tripura Centre at Lembucherra embarked on developing a specialised dual-purpose bird that could thrive in local conditions while significantly outperforming native breeds. The result of these efforts is '*Tokbari*', a promising indigenous poultry cross-bred specifically developed for rural backyard farming in the north-eastern region of India.

Male mature *Tokbari* chicken with larger body size and more prominent comb

Female mature *Tokbari* chicken with its characteristic colouration suitable for camouflage in free-range conditions

Background

The north-eastern India is primarily agricultural with rural backyard poultry being a significant allied activity within the mixed farming systems prevalent in the hills. However, unlike the rapid growth of organised commercial poultry seen in other parts of India, poultry production in this region

has developed slowly. This sluggish growth can be attributed to several factors, including geographical isolation, limited infrastructure and the absence of breeds specifically adapted to local conditions.

Traditional poultry farming in this region including Tripura has been characterised by small-scale operations where farmers typically maintain 5–15 birds in their backyards with minimal inputs. These birds, predominantly indigenous or non-descript types, have evolved naturally over generations to adapt to local conditions but at the cost of productive performance. Though hardy and able to survive on scavenging with minimal care, these native birds exhibit poor egg production, slow growth rates, and smaller egg and body sizes compared to improved breeds.

The role of backyard poultry in rural economics began gaining increased recognition in recent years, particularly for its contribution to local egg and meat requirements in remote areas and its ability to provide quality food products at reasonable prices to local consumers. This growing appreciation coincided with national initiatives to enhance rural poultry productivity, leading to the establishment of the All India Coordinated Research Project (AICRP) on Poultry Breeding at ICAR Research Complex for NEH Region Tripura Centre.

The project commenced with comprehensive benchmark surveys conducted across villages in Tripura to understand farmers' preferences and requirements. These surveys revealed that farmers desired dual-purpose birds that combined good growth characteristics with egg-laying abilities, early feathering, brown-shelled eggs of larger size, low mortality, and excellent foraging and scavenging habits. These insights formed the foundation for the breeding programme that eventually produced the *Tokbari* chicken.

Genetic composition and development

The development of *Tokbari* represents a systematic approach to combining the desirable traits of native and improved breeds. The genetic composition comprises 25% Tripura Black (local native breed), 25% Coloured Broiler [CSFL - Coloured synthetic female line] (Dam line from ICAR-Central Avian Research Institute, Izatnagar), and 50% Dahlem Red (ICAR-Directorate of Poultry Research, Hyderabad). Each parent breed brought specific attributes to the genetic pool.

The Tripura Black, sourced from local farmers, contributed adaptation to local conditions, disease resistance, and scavenging ability. The Coloured Broiler dam line (CSFL) contributed superior growth characteristics and body conformation. Dahlem Red contributed improved egg production capabilities along with moderate body weight. Their egg production up to 52 weeks of age is substantially higher at approximately 112–120 eggs, with eggs weighing about 53–57 g under farm condition.

The name '*Tokbari*' reflects its local roots and purpose. '*Tok*' means birds in the *Kokborok* language (An indigenous language of Tripura), while '*Bari*' refers to backyard or homestead in Bengali. This naming acknowledges the cultural context while emphasising its suitability for backyard rearing.

Physical characteristics and performance

***Physical traits*:** *Tokbari* chickens possess distinctive physical characteristics that make them immediately recognisable and suitable for rural conditions. They feature attractive multi-coloured plumage patterns ranging from brown and reddish-brown to blackish and various combinations. This colour diversity not only makes them aesthetically appealing but also provides natural camouflage against predators in free-range conditions. The birds exhibit normal feather morphology with fast feather growth, enabling quicker development of protection against environmental challenges. They possess single red combs of varying sizes (medium to large in males and small to medium in females). The skin colour is predominantly pinkish-white, while shank colours vary from yellow and creamy white to mixed patterns.

The body conformation of *Tokbari* sets apart physically from others. The birds have relatively long shanks and strong body structure that enables them to move faster in free-range conditions for scavenging and better protect themselves from predators. This physical adaptation makes them particularly suited to the traditional free-range scavenging systems prevalent in rural Tripura.

***Reproductive traits*:** The reproductive traits are equally impressive. *Tokbari* hens reach sexual maturity around 165–175 days, approximately 8% earlier than native birds. The eggs are larger, compared to native birds, representing a 26% improvement. Most significantly, annual egg production ranges from 120–160 eggs/bird, a remarkable 133% increase over the native birds. Under natural brooding conditions, *Tokbari* hens typically lay a clutch of 12–15 eggs per setting. Fertility and hatchability of *Tokbari* eggs average approximately 85% and 80% respectively, comparing favourably with native birds of the region, which

Table 1. Performance comparison of *Tokbari* birds with native birds at farmer's field

Parameter	Native birds	*Tokbari* birds	Improvement (%)
Body weight at 20 weeks (males) kg	1.2 (1.0–1.5)	1.9 (1.6–2.2)	58
Body weight at 20 weeks (females) kg	0.9 (0.7–1.0)	1.4 (1.2–1.6)	56
Body weight at 40 weeks (males) kg	1.5 (1.3–1.9)	2.5 (2.0–3.0)	66
Body weight at 40 weeks (females) kg	1.1 (1.0–1.3)	1.6 (1.4–1.9)	45
Age at sexual maturity (days)	185 (175–205)	171 (165–175)	8
Egg weight (g)	38 (35–43)	48 (45–51)	26
Annual egg production (number)	60 (45–75)	140 (120–160)	133

Note: Values in parentheses indicate the observed range (minimum–maximum) recorded across farmers' fields. Native bird performance values are consistent with published reports (Haunshi *et al.* 2009, Malik and Singh 2013).

Tokbari chickens rearing in tribal villages of Tripura

record fertility of approximately 75–80% and hatchability of 70–75% under backyard conditions. Day-old *Tokbari* chicks weigh approximately 32 g at hatch, consistent with the egg weight range of 45–51 g recorded for the variety, given that day-old chick weight typically corresponds to 68–72% of hatching egg weight. The prevailing price of *Tokbari* day-old chicks supplied through ICAR Research Complex for NEH Region, Tripura Centre is ₹25/chick, which remains accessible for smallholder farmers given the significantly higher net returns of ₹346/bird demonstrated over the production cycle.

***Mortality*:** *Tokbari* birds demonstrate good survival rates under field conditions. The mortality during the brooding period (0–6 weeks) averages around 5.75%, while during the growing period (7–20 weeks) it is approximately 7.52%. During the laying phase (21–72 weeks), mortality rates are minimal at just 1.55%. These figures reflect the bird's robust health and adaptability to local conditions.

Economic impact and livelihood benefits

The economic benefits of rearing *Tokbari* birds compared to native breeds are substantial and compelling for small-scale farmers. An economic assessment based on farmer feedback provided clear evidence of the financial advantages.

Management practices for optimal performance

The successful rearing of *Tokbari* birds requires appropriate management practices tailored to their needs. During the initial 4–6 weeks, chicks require brooding to maintain proper body temperature. After this period, they can be allowed to scavenge in backyard surroundings. For brooding, artificial heat can be provided using bulbs, infrared bulbs, heat coils, or brooders made from locally available materials.

Nutritionally, *Tokbari* chicks benefit from balanced feed during the first six weeks. Initially, a 10% jaggery solution can be offered within 30 min of chick arrival, followed by crushed maize or dalia for 2–3 days. Subsequently, a complete balanced fortified feed with required minerals and vitamins should be provided. Antimicrobials should not be used as growth promoters in *Tokbari* birds reared under backyard or free-range systems. Their use should be strictly restricted to therapeutic purposes i.e. only under veterinary prescription for the treatment of confirmed bacterial infections.

After the brooding period, *Tokbari* birds adapt well to free-range scavenging and can be maintained

Table 2. Economic assessment of *Tokbari* birds compared to native birds (unit of 20 birds)

Parameter	Native birds (₹)	*Tokbari* birds (₹)
Income		
Income from sale of males	3,360	5,600
Income from sale of eggs	4,800	11,200
Income from sale of females	2,464	3,584
Total Income (A)	10,624	20,384
Expenditure		
Cost of chicks	500	500
Supplementary feeding	—	1,040
Labour (imputed family labour)	2,000	3,000
Housing and shelter (depreciation)	600	600
Vaccination and healthcare	400	700
Brooding cost (electricity/fuel)	—	400
Equipment (feeders, drinkers)	200	200
Miscellaneous	200	300
Total cost (B)	3,900	6,740
Profitability		
Net profit (A -B)	6,724	13,644
Additional profit over native birds	—	6,920
Additional profit per bird	—	346
Benefit-cost ratio (BCR)	2.72	3.02
Incremental BCR (*Tokbari* over native)	—	1.94

Note: Labour has been imputed at prevailing family labour rates as per standard farm economic analysis practice. Assumed 20% average mortality; Male selling price: ₹280/kg; Egg price: ₹10/egg.

Success stories of farmers across Tripura

Mr. Safarmia from Aralia village who previously engaged in broiler farming, switched to rearing *Tokbari* birds after receiving 500 chicks from the ICAR center. With minimal mortality (less than 3%), he was able to sell cockerels weighing 2–2.5 kg at six months of age for ₹280/kg, generating an income of ₹90,000 within six months. Additionally, his flock produced 160–200 eggs daily during peak production, providing a daily profit of ₹1,000 by selling eggs at ₹10–12 each. Over nine months, he earned a net profit of approximately ₹1.50 lakhs, significantly higher than what he previously earned from broiler chickens.

Similarly, Mr. Tapan Debnath from Rani Bazar who was struggling financially with his six-member family, received 350 *Tokbari* chicks. With minimal mortality (only 10 birds), he sold three-month-old birds weighing 900–1,200 g at ₹290/kg, earning a net profit of ₹45,600 in just three months. Such success stories highlight how *Tokbari* birds can transform rural livelihoods through improved productivity and income generation.

Distribution and adoption

The widespread acceptance and adoption of *Tokbari* chickens across north-eastern region reflect their suitability and performance. From 2014 to March 2025, the ICAR Research Complex for NEH Region Tripura Centre supplied more than 1.27 lakhs *Tokbari* gerrmplasms to farmers across this region. The distribution of chicks has been accompanied by extensive extension activities, including training programmes, awareness campaigns, demonstration programmes, television talks, and health/vaccination camps. These efforts have significantly enhanced farmers' knowledge and skills in poultry management, contributing to the successful adoption and performance of *Tokbari* birds under field conditions.

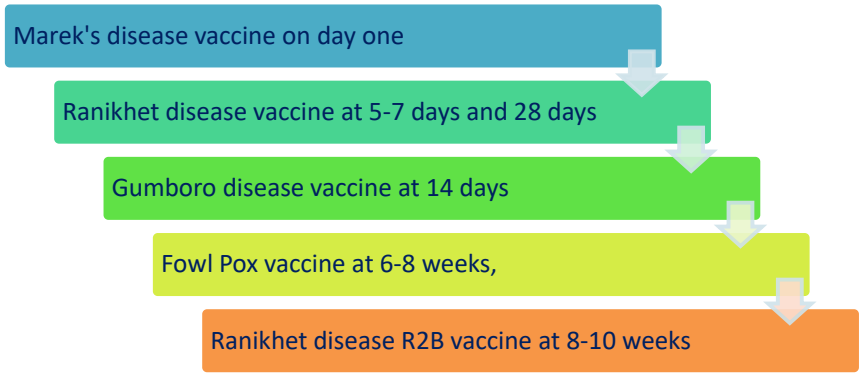
on kitchen waste and supplementary feeding. Supplementary feed should be offered twice daily i.e. a small quantity in the morning before the birds are released for scavenging, and again in the evening when they return to the shelter, as evening feeding also helps train birds to return willingly to the enclosure before nightfall. They scavenge effectively on leftover human food, insects, worms, larvae, snails, termites, and various plant materials. Supplementary feeding with locally available grains which are commonly grown and readily available enhances their performance. During the laying period, calcium supplementation (3–4 g/bird/day) through shell grit, stone grit, limestone, or DCP powder is essential for producing good quality eggs.

For housing, simple structures using locally available low-cost materials such as mud, stone, wire mesh, bamboo, or wood provide adequate night shelter and protection from rain. A floor space of 1.5–2.0 square feet per bird is recommended, with bedding materials like rice husk, groundnut hulls, or wood shavings that should be kept dry at all times.

Table 3. Recommended supplementary feed formulation for *Tokbari* birds using locally available ingredients

Ingredient	Starter (0–6 weeks) (%)	Grower (7–20 weeks) (%)	Layer (21–72 weeks) (%)
Maize/Broken rice	45	50	45
Rice bran/Wheat bran	15	18	15
Soybean meal/Groundnut cake	25	18	20
Fish meal	10	8	8
Shell grit/Limestone powder	1	2	8
Mineral and vitamin premix	2	2	2
Common salt	0.5	0.5	0.5
Di-calcium phosphate (DCP)	1.5	1.5	1.5
Total	100	100	100
Crude protein (%)	22	16	18
Metabolizable energy (Kcal/kg)	2,800	2,600	2,650

Note: Ingredients may be substituted with other locally available alternatives such as Job's tears, finger millet, or rice bean depending on seasonal availability and cost.



Vaccination schedule against common diseases

Note: Regular deworming every 2-3 months helps control parasitic infestations.

Official distribution of *Tokbari* chicks: (left) Dr. Sanjeev Kumar Balyan, former Union Minister of State for Fisheries, Animal Husbandry and Dairying; (right) Shri Naresh Chandra Jamatia, Former Rural Development & Forestry Minister, Government of Tripura

SUMMARY

Tokbari, a dual-purpose poultry breed developed by ICAR Research Complex for NEH Region, represents a breakthrough for rural north-eastern India. This locally-adapted germplasm delivers remarkable improvements over native birds: 133% higher egg production, 26% larger eggs, and 45–66% higher body weights. With an additional profit of ₹346/bird and a benefit-cost ratio of 3.02, *Tokbari* significantly enhances rural incomes and nutrition security. Its multi-coloured plumage, moderate weight, and excellent scavenging ability make it ideal for backyard farming. Its adaptability to local conditions and ability to thrive in low-input systems perfectly suit the socio-economic context of rural communities, contributing to regional self-sufficiency in poultry production.

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