



Conservation and Socio-Economic Potential of Aseel Chicken for Sustainable Poultry Farming in Bangladesh

Shuvrodeb Sarkar¹, S. M. Khaladur Rahman Shuvo¹, Turja Chakraborty, Md. Salman Farse Shadin¹, Md. Mehedi Hasan¹, Syed Sarwar Jahan¹, and Md. Shariful Islam^{1*}

Abstract

The Aseel chicken, an indigenous breed native to South Asia, holds significant cultural and economic value in Bangladesh due to its unique morphological traits, behavioral characteristics, and resilience to adverse environmental conditions. This study explores the origins, phenotypic features, and socio-economic importance of the Aseel chicken within rural Bangladeshi communities. Despite its advantageous attributes—including disease resistance, heat tolerance, and superior carcass quality—the breed remains underutilized in commercial poultry farming due to its slow growth rate, low egg production, and pronounced broodiness. The Aseel's adaptability to local climatic conditions underscores its potential as a valuable genetic resource for sustainable poultry production. However, threats such as genetic erosion, habitat degradation, and limited inclusion in research and policy frameworks pose significant risks to the breed's survival and genetic integrity. To address these challenges, comprehensive conservation strategies—encompassing genetic preservation, community-based management, and integration into national agricultural policies—are

essential. Additionally, research-driven improvements in productivity and increased public awareness can promote both the sustainable utilization and conservation of this indigenous breed. This study underscores the critical need for targeted interventions to safeguard and enhance the Aseel chicken, contributing to rural socio-economic development, food security, and the preservation of Bangladesh's rich cultural heritage.

Keywords: Aseel breed, Indigenous chicken, Conservation, Rural development, Genetic diversity, Sustainable poultry production

1. Introduction

Indigenous chickens in Bangladesh are often raised within a scavenging production system. Traditionally, they fulfill numerous roles, e.g., laying eggs, hatching chicks, brooding, and caring for them. These many activities inhibit chickens from realizing their maximum egg production potential (Sarkar & Bell, 2006). Aseel is one of the principal breeds of Indigenous poultry in the Indo-Pak subcontinent, utilized either as a game bird or as backyard poultry in rural areas (Khan, 2004). The Aseel is a globally recognized chicken breed noted for its variety (Mahmood et al., 2017). This breed is noted for its exceptional endurance, regal walk, illness resistance, and adaptation to harsh climatic conditions (Singh, 2009). Aseel chicken breeds originated from India and are widely recognized for their agility, pugnacity, tenacious fighting tenacity, and adaptation to the indigenous circumstances of the Indo-Pak sub-continent (Singh, 2001). In Pakistan, four kinds of Aseel are identified: Lakha (LK), Mushki (MS), Mianwali (MW), and Peshawari (PW) (Babar et al., 2012). This slow-growing breed is

Significance | This study emphasizes conserving Aseel chickens to enhance rural livelihoods, food security, and preserve Bangladesh's cultural and genetic heritage.

*Correspondence. Md. Shariful Islam, Department of Veterinary and Animal Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh
E-mail: msips06@ru.ac.bd

Editor Muhammad Jahangir Hossen, Ph.D., And accepted by the Editorial Board April 12, 2024 (received for review February 06, 2024)

Author Affiliation.

¹ Department of Veterinary and Animal Sciences, University of Rajshahi, Rajshahi-6205, Bangladesh

Please Cite This:

Sarkar, S., Shuvo, S. M. K. R., Chakraborty, T., Shadin, M. S. F., Hasan, M. M., Jahan, S. S., Islam, M. S. (2024). "Conservation and Socio-Economic Potential of Aseel Chicken for Sustainable Poultry Farming in Bangladesh", *Livestock Research*, 2(1),1-8,10118

© 2024 LIVESTOCK RESEARCH a publication of Eman Research, USA.
This is an open access article under the CC BY-NC-ND license.
(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).
(<https://publishing.emanresearch.org>).

regarded as one of the progenitors of Cornish and Plymouth Rock, the parents of today's contemporary broiler (Dohner, 2001). The name "Aseel" is taken from Arabic, which means "pure" or "SSor" "thoroughbred". Its pugnacity, erect stance, short wattles, pea comb, broad shoulders, thin sternum, and firm muscular thighs with powerful legs (Dohner, 2001) and large body weights (Ahmad et al., 2014) are well-known traits of the Aseel. Aseel has high carcass quality and is noted for large body size, long shanks, handsome, endurance, and aggressive nature. This breed is near extinction and is now being used largely for cock-fighting (Bhatti et al., 1991; Khan, 2004). Based on its body weight, illness resistance, strength, and adaptation to survive extreme climatic conditions, Aseel may be employed and further refined as a meat-type bird.

Backyard poultry farming has a key role in the economics and livelihood of impoverished families, the elimination of poverty and unemployment, as well as in improving the nutritional and economic condition of rural people (Alam et al., 2014; Rajkumar et al., 2010). Furthermore, backyard poultry farming is very crucial to women's empowerment and nutritional security (Kumar, Dahiya, & Ratwan, 2021). However, they do not have an adequate understanding of scientific backyard poultry techniques (Kumar, Dahiya, Sheoran, et al., 2021).

The Aseel chicken, indigenous to South Asia, has been integral to Bangladesh's rural agricultural systems for millennia. This breed is recognized for its sturdy build, significant disease resistance, and adaptation to free-range husbandry settings (Singh, 2009). Notwithstanding its distinctive attributes, the Aseel breed is notably underexploited in commercial poultry farming, mostly owing to its sluggish development and inferior egg production relative to commercial broilers and layers. Nonetheless, its importance in conventional farming justifies careful consideration of its preservation and advancement. Therefore, this review aims to explore the knowledge of the chicken's needs for awareness programs to improve the socioeconomic and nutritional status for preservation.

2. Origin of Aseel chicken

The Aseel chicken, known for its muscular build, aggressive temperament, and exceptional stamina, is one of the oldest indigenous breeds originating from the Indian subcontinent, particularly from regions now comprising India, Bangladesh, and Pakistan. Historically, Aseel chickens were primarily bred for cockfighting due to their strength and bravery (Figure 1), although they are now also valued for their hardiness and meat quality (Chatterjee et al., 2016). Ancient scripts and carvings suggest that Aseel chickens have been present for thousands of years, with early mentions dating back to the Indus Valley Civilization (Panda & Mahapatra, 2012). The breed was introduced to other parts of the world, including Europe, during the colonial era, where it

influenced the development of several game and meat breeds (Rashid et al., 2017). Several varieties of Aseel, such as Peela, Teekar, and Yakub, have developed based on regional preferences and selective breeding practices (Patra & Bais, 2018). Even today, Aseel chickens remain a symbol of cultural pride in many rural areas, reflecting their deep-rooted historical and socio-economic significance (Haunshi et al., 2011).

3. Characteristics of Aseel Chickens

3.1 Physical Traits

Aseel chickens are distinguished by their muscular body, tiny combs, glossy plumage, and powerful legs (Figure 2). Variants in color include black, red, and white, with the black version being especially popular in Bangladesh (Rajkumar et al., 2017). Aseel is noted for its majestic pace, pugnacity, stamina, and stubborn qualities (Jabbar et al., 2015). It is one of the biggest sizes in all Indian Indigenous chickens, having 28 inches in length from back to toe, upright posture, prominent stature, strong musculature, great stamina, and strength, making this breed well-acclimatized to tropical and sub-tropical environmental conditions all over the sub-continent (Dohner, 2001).

3.2 Behavioral Traits

Known for their ferocity and territorial attitude, Aseels have been traditionally employed for cockfighting. This behavioral feature also makes them great foragers and capable of prospering in low-input settings. Aseel is a game chicken breed recognized for its pugnacity, magnificent walk, strong endurance, aggressive fighting qualities, and long legs and necks. Rural poultry is an important sub-sector of poultry production in developing nations (Khan et al., 2017). The sexual maturity of Aseel birds was obtained in the 26th week, which was later than that reported by Mohan et al. (2008) and Haunshi et al., (2011) that was possibly due to the increasing daylight in the latter period of bird's growing age and partially due to the improved management procedures. It is said that Aseel pullets may attain sexual maturity much earlier and that the egg production, egg mass, FCR/dozen eggs, FCR/kg egg mass, and egg Se content can be boosted in the pullets of Aseel via feeding Se-Y supplemented diet @ 0.3 ppm (Zia et al., 2017).

3.3 Productivity

The Aseel chicken is distinguished by high body weight, but poor egg production capacity therefore resulting to smaller offspring size owing to unpredictable ovulation, brief clutches, and broodiness. The production potential of Aseel variations has still not been completely realized by not adopting enhanced production methods like the fortification of feed with probiotics and antibiotics on this breed of chickens (Usman et al., 2013). While Aseels are not prolific layers, their flesh is appreciated for its taste and nutritional content. They generally produce 40–50 eggs yearly under conventional raising circumstances. The local chicken weighs around 1.0–1.5 kg

on average at six months of age (Rajkumar et al., 2016). Aseel may be utilized as a meat-type bird, and its development potential can be expanded by better nutrition, utilizing contemporary nutritional methods. Recent research indicated that organic selenium supplements to boost the growth performance of Aseel (Zia et al., 2017). Egg volume is another crucial egg morphometric characteristic documented with differences in values related to various Aseel types (Khan et al., 2021). (**Table 1**).

3.4 Genetic Resilience

The Aseel breed is notable for its susceptibility to common chicken illnesses and its endurance to severe settings, making it excellent for smallholder farming. The bursa was the sole organ exhibiting substantial alterations in Aseel, suggesting that some intrinsic factor(s) in this breed is or are responsible for these abnormalities in disease (Prabhu et al., 2020). Indigenous breeds of chicken have superior disease resistance and adaptation to the local severe environment (Khan et al., 2017). Its immune system is greatly strengthened against illnesses as compared to other local breeds (Jatoi et al., 2014).

4. Importance of the Aseel Breed

4.1 Economic Contribution

Aseel chicks provide additional revenue for rural farmers, especially via meat sales and traditional cockfighting tournaments, which have cultural importance in some areas. Over 80% of global poultry production occurs in village production systems, which provide up to 90% of chicken products in some developing nations (Guèye, 1998). Village poultry significantly enhances family food security in poor countries. It aids in income diversification, supplies high-quality food and fertilizer, and serves as a mechanism for family savings and insurance. Poultry output from rural family's accounts for 70% of overall production in many low-income food-deficient nations, with indigenous chicken meat priced 13% to 27% more in markets and supermarkets than commercial chicken meat (Branckaert et al., 2000).

4.2 Genetic Resources for Breeding

The genetic advantages of Aseel chickens are essential in their breeding and selection initiatives. Aseel chickens are esteemed for their genetic characteristics, including disease resistance, adaptation to extreme weather circumstances, and general robustness. These genetic characteristics make Aseel chickens an attractive breed for sustainable and profitable poultry production in Bangladesh. The strong genetics of Aseel chickens render them suitable for crossbreeding initiatives designed to enhance disease resistance and adaptation in commercial poultry. The conservation and the genetic improvement of the local breeds under local circumstances are inevitable without the availability of proper knowledge and data on performance and genetic uniqueness. Fertility is an essential metric in chickens and measures the entire

real reproductive capability of females and males, represented by their ability when mated together to generate offspring (Miazi et al., 2012). It was determined that the Aseel chicken breed plays a vital part in the rural economy of Bangladesh, offering a crucial source of revenue and sustenance for local populations. Additionally, the species demonstrates high resistance to varied environmental circumstances, making it well-suited for the country's diverse terrain. The Aseel chicken breed bears important relevance in the context of poultry production in Bangladesh. This indigenous breed is noted for its durability and adaptation to local climatic circumstances, making it a significant genetic resource for sustainable poultry production. By knowing the particular features and genetic qualities of the Aseel breed, researchers and farmers may establish specialized breeding programs targeted at boosting disease resistance, productivity, and the general welfare of chicken stock in the area.

4.3 Cultural Significance

Aseel is a world-renowned game bird that has been preserved throughout the years largely by the game bird farmers in Sarail upazila of Brahmanbaria district, and members of cock fighting clubs in urban and city inhabitants of Bangladesh (Sarker et al., 2012). The Aseel breed is strongly established in the cultural fabric of rural Bangladesh, generally linked with prestige and tradition (Chowdhury & Rahman, 2018). Initially, the Aseel chicken was used in cockfighting events, but in many developing nations, including Pakistan. Cockfighting is prohibited in the United States, and Louisiana was the final state to abolish this activity in 2007 (Rehman et al., 2018). The Aseel chicken breed may help to the preservation of cultural heritage and traditional agricultural techniques in Bangladesh. As a breed profoundly ingrained in the country's past, the Aseel maintains cultural and economic importance for many rural areas.

5. Threats to the Aseel Breed

5.1 Genetic Erosion

Crossbreeding with commercial breeds to enhance productivity has diluted the genetic purity of Aseel chickens (Islam et al., 2020). Native chickens are being reared as rural backyard poultry and their genetic potential has not been fully explored (Padhi, 2016). It may be concluded that physiological responses in Aseel breeds are affected by season. hot-humid season, thereby indicating stressful conditions in native birds, whereas winter had no effect (Shanmathy et al., 2017).

5.2 Habitat Loss

Urbanization and the decline of backyard poultry farming have reduced the natural habitats and rearing environments for Aseel chickens. The Aseel chicken, a native breed of Bangladesh, is noted for its toughness and adaptation to local circumstances. Historically, Aseel chickens have been vital to rural lives, producing

meat and eggs for subsistence farming. However, habitat loss and environmental deterioration have drastically reduced their numbers (Sarker et al., 2012). Urbanization, deforestation, and agricultural development have contributed to the degradation of natural habitats, diminishing the regions where Aseel chickens may survive. This loss of habitat affects the breed's survival and lowers the genetic variety required for resistance against illnesses and climate change. Conservation efforts are needed to safeguard these indigenous hens, which are considered endangered and require urgent care to avoid future decline (Hamid, 2019).

5.3 Neglect in Research and Policy

Despite its potential, the Aseel breed has received limited attention in national poultry development programs, hindering its sustainable development. Neglect in research and policy significantly exacerbates threats to the Aseel chicken breed in Bangladesh, as inadequate scientific attention and policy frameworks fail to address its declining genetic diversity and socio-economic potential. Despite the Aseel's resilience to local climates and disease resistance, its slow growth rate and low egg production have led to its marginalization in commercial poultry systems, with limited inclusion in national agricultural research agendas (Blackburn 2006). The lack of targeted conservation policies, such as gene banking or breed-specific subsidies, leaves the Aseel vulnerable to genetic erosion, as seen in other rare breeds globally. For instance, while countries like the U.S. prioritize germplasm preservation for rare livestock, Bangladesh lacks comparable infrastructure, leaving indigenous breeds like the Aseel underserved (Heinrichs, 2022). Additionally, the absence of public awareness campaigns and community-based management programs—key to sustaining rare breeds—further isolates the Aseel from conservation efforts. Without urgent policy interventions and research investments to document its genetic traits and cultural value, the Aseel risks irreversible decline, undermining biodiversity and rural livelihoods.

5.4 Slow Growth and Low Productivity

Aseel breed is confronting the challenges of poor growth rate, late maturity, reduced persistence and quantity of egg production, broodiness, and low fertility and hatchability rates (Iqbal et al., 2012). The breed's sluggish development rate and lesser egg output are frequently considered as drawbacks in contrast to commercial poultry breeds. Domestic poultry plays a crucial role in animal protein production. However, from a production point of view, Aseel is a sluggish grower and poor producer, which is the main difficulty in cultivating Aseel (Blackburn, 2006). Its poor performance is out of specific limits connected with socioeconomic instability (Batoool et al., 2018). Problems associated with Aseel birds include poor early growth, low FCR, increased cost of production, and late maturity (Jatoi et al., 2014).

6. Conservation Strategies

6.1 Genetic Preservation

Establishing Aseel-specific breeding programs and gene banks is crucial for maintaining the breed's genetic purity and diversity. Knowledge related to the variation of morphometric traits in the existing genetic resources is most significant for the characterization of livestock, including poultry (Delgado et al., 2001). Blood biochemical profiling can help monitor a bird's health and physiological status and is also interlinked with many variables like sex, age, breed, feeding routine, management, and anxiety level (Lloyd & Gibson, 2006). Blood biochemical profiling will also be very helpful to provide baseline information about the required factors or genes, i.e., genes for disease resistance to be improved and used in management, as well as breeding programs for the conservation of concerned breeds (Sonaiya, 2007). Such analyses have been discussed in several studies concerning domestic animals, but are very rare concerning broiler chickens and even for Aseel chickens. Aseel is recognized for its endurance, tolerance of heat and stress conditions, and adaptability to a warm and humid climate, and is being used for the propagation of superior germplasm, which is appropriate for backyard poultry farming. The diversity in agroecology, climatic conditions, and variation in the purpose of chicken rearing in different regions and production environments in the tropics are believed to contribute to the current high diversity in chicken genetic resources in these areas. However, genetic improvements in the tropics on native Indigenous chicken genetic resources are either rare or non-existent (Dessie et al., 2011). Therefore, genetic conservation is an excellent tool to save this genetic resource in a developing country like Bangladesh.

6.2 Community-Based Rearing

Encouraging smallholder farmers to rear Aseels through financial incentives and training can promote conservation at the grassroots level. Changes in traditional management practices can improve the performance of native chickens and thus contribute to household incomes per year as reported in Indigenous chickens in Bangladesh (Sarkar & Golam, 2009). Providing more welfare-friendly environments, which may curtail animal suffering, is becoming locally and globally important because of the free trade among different nations (Kim et al., 2017). Outdoor rearing systems help minimize stress in birds and enhance their welfare by providing more opportunities for walking and roaming (Fanatico et al., 2006), which will improve their foraging, feed selection, and dustbathing behaviors, and thus their welfare is theoretically enhanced (Ponte et al., 2008). The inability of a chicken to perform dustbathing can be stressful and detrimental to its well-being (Fraser & Duncan, 1998).

6.3 Policy Integration

Incorporating the conservation of indigenous poultry breeds like Aseel into national agricultural and livestock policies is essential. Preserving the indigenous Aseel chicken breed in Bangladesh is

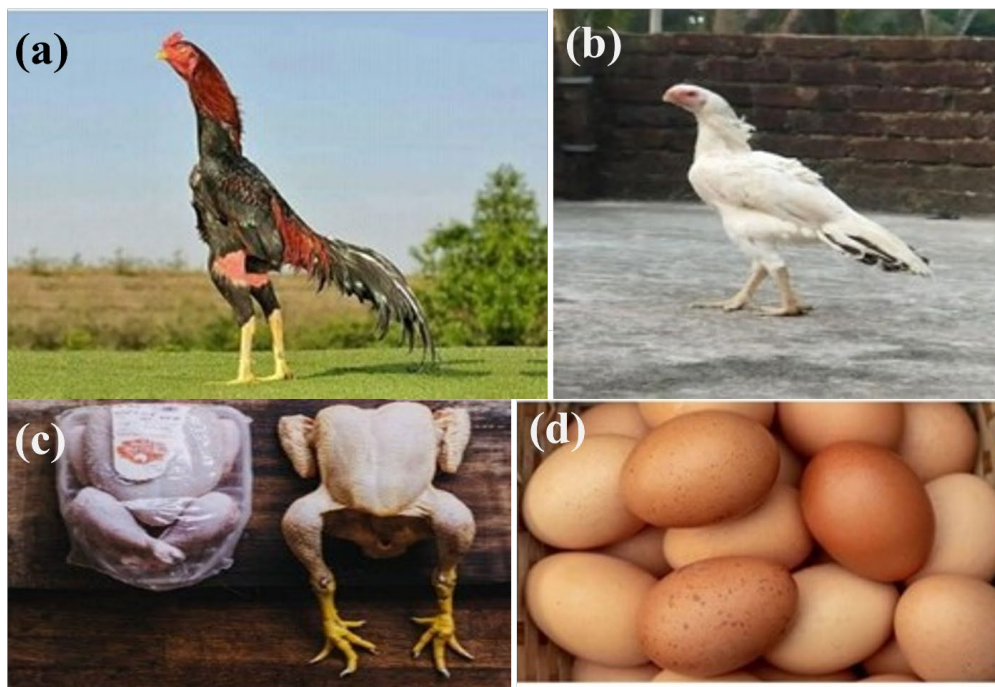


Figure 1. At a glance, images of the Aseel male (a), female (b), meat (c), and egg (d).



Figure 2. Beautiful cockfighting of the Aseel chicken

Table 1. The body morphometric traits of Aseel (Kumar et al., 2022)

Traits	Mean \pm SD
24-week body weight (g)	1369.77 \pm 257.43
Comb length (cm)	3.12 \pm 0.97
Keel length (cm)	16.81 \pm 1.85
Body length (cm)	35.32 \pm 3.09
Back length (cm)	20.62 \pm 1.89
Breast girth (cm)	27.87 \pm 2.66
Breast angle (degree)	60.75 \pm 4.71
Radius Ulna length (cm)	14.05 \pm 2.32
Shank length (cm)	8.19 \pm 1.28
Shank circumference (cm)	4.63 \pm 0.57
Tail length (cm)	17.83 \pm 3.16

essential for sustaining the nation's genetic variety, cultural history, and rural economies. The Aseel breed is distinguished for its robustness, illness resistance, and adaptation to regional settings. Nonetheless, obstacles like genetic degradation and restricted participation in commercial poultry production jeopardize its existence. The Bangladesh National Conservation Strategy (2021–2036) prioritizes biodiversity conservation and sustainable resource management, establishing a framework for the preservation of indigenous breeds such as the Aseel (Bangladesh Ministry of Environment, Forest and Climate Change, 2021). The National Poultry Development Policy (2008) promotes the conservation and enhancement of indigenous chicken breeds via in-situ and ex-situ approaches, emphasizing the necessity of educating poultry farmers in effective production techniques (Ministry of Fisheries and Livestock, 2008). Individuals may actively join in conservation efforts by consulting local livestock offices about current initiatives, collaborating with research institutes like Bangladesh Agricultural University, and enforcing stringent biosecurity protocols to ensure flock health. Implementing biosecurity measures, including regulating farm access, isolating infected birds, and ensuring sanitation, is crucial for averting disease outbreaks (Islam et al., 2024). Engaging in training programs provided by entities such as the FAO's Emergency Centre for Transboundary Animal Diseases (ECTAD) may improve agricultural practices and diminish antibiotic usage (FAO, 2025). Furthermore, obtaining information on grants or subsidies from governmental or non-governmental organizations might facilitate the implementation of breeding programs and infrastructure development for Aseel chicken conservation.

6.4 Research and Development

Investing in research to improve the productivity of Aseels without compromising their genetic integrity can help popularize the breed in semi-commercial farming systems. Research and development (R&D) are essential for preserving the Aseel chicken breed in Bangladesh, a valuable indigenous genetic resource known for its resilience and adaptability. The Bangladesh Agricultural University (BAU) has undertaken significant R&D initiatives, including a project funded by the Ministry of Education from July 2017 to June 2020, focusing on the characterization, conservation, and improvement of indigenous Aseel chickens. These efforts aim to enhance the breed's productivity and maintain its genetic diversity. Additionally, the Bangladesh Livestock Research Institute (BLRI) has implemented systematic breeding programs since 2000, improving the productivity of native chicken varieties, including the Aseel. Such R&D activities are crucial for developing effective conservation strategies, informing policy decisions, and promoting the sustainable utilization of the Aseel chicken breed in Bangladesh.

6.5 Public Awareness

Educating farmers and stakeholders about the economic and cultural value of Aseel chickens can encourage their preservation and sustainable use. Public knowledge plays a critical role in the preservation of the Aseel chicken in Bangladesh, as it develops community participation, supports sustainable agricultural techniques, and maintains genetic variety (Bhuiyan et al., 2011). Raising knowledge of the Aseel's cultural, economic, and ecological value might motivate rural people to prioritize its conservation above commercial hybrids, which endanger indigenous breeds via genetic erosion. Educational efforts may emphasize the Aseel's tolerance to local climatic circumstances, disease resistance, and exceptional meat quality, making it a significant asset for sustainable poultry agriculture. Additionally, public awareness projects may push for policy integration, asking government and agricultural authorities to integrate Aseel conservation in national programs, assuring long-term genetic preservation. Community-based management initiatives, backed by awareness efforts, may encourage farmers, especially women, to embrace better husbandry techniques while keeping traditional rearing systems (Muneeb 2021). Finally, media and awareness activities may clarify perceptions about the breed's poor production, highlighting its socio-economic potential and significance in food security, therefore inspiring pride and proactive conservation efforts.

7. Conclusion

The Aseel chicken, an indigenous breed of the Indian subcontinent, holds significant genetic, economic, and cultural value in Bangladesh. Known for its muscular build, disease resistance, and adaptability to harsh environments, the Aseel has historically been used for cockfighting and backyard poultry farming. However, despite its resilience and high-quality meat, the breed faces multiple threats, including genetic erosion due to crossbreeding, habitat loss from urbanization, neglect in research and policy, and low productivity compared to commercial poultry breeds. The Aseel's slow growth rate and poor egg production have marginalized it in commercial farming, yet its genetic traits—such as heat tolerance and disease resistance—make it a vital resource for sustainable poultry production. Additionally, its role in rural livelihoods, cultural heritage, and potential for niche markets (organic farming, game birds, and genetic conservation) underscores the need for urgent preservation efforts. Without intervention, the Aseel risks further decline, leading to irreversible loss of biodiversity and traditional farming knowledge.

Author contributions

MSI supervised the research and conceptualized the theme of the manuscript. SS and SMKRS conducted the literature review and wrote the original manuscript. TC and MSFS formatted the references of the manuscript. SSJ and MSI edited and reviewed the

manuscript. All authors reviewed, revised, and approved the final draft for publication.

Acknowledgment

The authors were grateful to their department.

Competing financial interests

The authors have no conflict of interest.

References

- Ahmad, Z., Sahota, A. W., Akram, M., Khaliq, A., Jatoi, A. S., Shafique, M., Usman, M., & Khan, U. (2014). Pre and post-moult productive efficiency in four varieties of indigenous Aseel chicken during different production cycles. *Journal of Animal & Plant Sciences*, 24(5).
- Alam, M. A., Ali, M. S., Das, N. G., & Rahman, M. M. (2014). Present status of rearing backyard poultry in selected areas of Mymensingh district.
- Babar, M. E., Nadeem, A., Hussain, T., Wajid, A., Shah, S. A., Iqbal, A., Sarfraz, Z., & Akram, M. (2012). Microsatellite marker based genetic diversity among four varieties of Pakistani Aseel Chicken. *Pakistan Veterinary Journal*, 32(2), 237–241.
- Bangladesh Livestock Research Institute (BLRI). (2021). Annual Report 2021. Retrieved from https://blri.portal.gov.bd/sites/default/files/files/blri.portal.gov.bd/page/27454ba6_605d_4ad8_b555_c22ed1da8502/2024-08-18-08-28-4b84e76fb3dfdd16e21b6b508df13927.pdf
- Bangladesh Ministry of Environment, Forest and Climate Change. (2021). Bangladesh National Conservation Strategy 2021–2036. Retrieved from <https://leap.unep.org/en/countries/bd/national-legislation/bangladesh-national-conservation-strategy-2021-2036>
- Batool, T., Roohi, N., Mahmud, A., & Usman, M. (2018). Subsequent effects of various dietary lysine regimens on production performance, egg persistency and economics of indigenous Aseel varieties.
- Bhatti, M. A., Qureshi, M. S., & Ahmad, A. (1991). Comparative study on the performance of various genetic groups of Aseel and its crosses with exotic breeds of poultry under controlled & field conditions. Second Annual Report, Pakistan Agric. Res. Council, Islamabad.
- Bhuiyan, A. K. F. H., Bhuiyan, M. S. A., & Deb, G. K. (2011). Indigenous chicken genetic resources in Bangladesh: Current status and future outlook. *Animal Genetic Resources*, 36, 73–84. <https://doi.org/10.1017/S101423390001899>
- Blackburn, H. D. (2006). The national animal germplasm program: Challenges and opportunities for poultry genetic resources. *Poultry Science*, 85(2), 210–215. <https://doi.org/10.1093/ps/85.2.210>
- Branckaert, R. D. S., Gaviria, L., Jallade, J., & Seiders, R. W. (2000). Transfer of technology in poultry production for developing countries. Proceedings of the XXI World's Poultry Congress, 20–24.
- Chatterjee, R. N., Sharma, R. P., Reddy, B. L. N., & Niranjana, M. (2016). Conservation of indigenous chicken germplasm: A review. *World's Poultry Science Journal*, 72(3), 585–598. <https://doi.org/10.1017/S0043933916000560>
- Chowdhury, S. D., Ahmed, S., & Hamid, M. A. (2006). Improved feeding of desi chicken reared in confinement. *The Bangladesh Veterinarian*, 23(1), 29–35.
- Delgado, J. V., Barba, C., Camacho, M. E., Sereno, F., Martínez, A., & Vega-Pla, J. L. (2001). Caracterización de los animales domésticos en España. *Animal Genetic Resources/Resources Génétiques Animales/Recursos Genéticos Animales*, 29, 7–18.
- Dessie, T., Taye, T., Dana, N., Ayalew, W., & Hanotte, O. (2011). Current state of knowledge on phenotypic characteristics of indigenous chickens in the tropics. *World's Poultry Science Journal*, 67(3), 507–516.
- Dohner, J. V. (2001). The encyclopedia of historic and endangered livestock and poultry breeds. Yale University Press.
- Fanatico, A. C., Pillai, P. B., Cavitt, L. C., Emmert, J. L., Meullenet, J. F., & Owens, C. M. (2006). Evaluation of slower-growing broiler genotypes grown with and without outdoor access: Sensory attributes. *Poultry Science*, 85(2), 337–343.
- Food and Agriculture Organization (FAO). (2025). Emergency Centre for Transboundary Animal Diseases (ECTAD) in Bangladesh. Retrieved from <https://www.fao.org/ectad/asiapacific/about-us/where-we-work/ectad-in-bangladesh/en>
- Fraser, D., & Duncan, I. J. H. (1998). 'Pleasures', 'pains' and animal welfare: toward a natural history of affect. *Animal Welfare*, 7(4), 383–396.
- Guèye, E. H. F. (1998). Village egg and fowl meat production in Africa. *World's Poultry Science Journal*, 54(1), 73–86.
- Haunshi, S., Doley, S., & Shakuntala, I. (2011a). Production performance of indigenous chicken of northeastern region and improved varieties developed for rural poultry production. *Indian Journal of Animal Sciences*, 81(4), 375–381.
- Haunshi, S., Niranjana, M., Shanmugam, M., Padhi, M. K., Reddy, M. R., Sunitha, R., Rajkumar, U., & Panda, A. K. (2011b). Characterization of two Indian native chicken breeds for production, egg and semen quality, and welfare traits. *Poultry Science*, 90(2), 314–320.
- Heinrichs, C. (2022). The old is new again: Neglected breeds get modern appreciation. *Backyard Poultry*. <https://backyardpoultry.iamcountryside.com/chickens-101/the-old-is-new-again/>
- Iqbal, A., Akram, M., Sahota, A. W., Javed, K., Hussain, J., Sarfraz, Z., & Mehmood, S. (2012). Laying characteristics and egg geometry of four varieties of indigenous Aseel chicken in Pakistan.
- Islam, M. A., et al. (2024). Farm biosecurity practices affecting avian influenza virus circulation in commercial chicken farms in Bangladesh. *One Health*, 18, 100681. <https://doi.org/10.1016/j.onehlt.2024.100681>
- Jabbar, A., Abbass, W., Riaz, A., Ahmad, M., Sattar, A., & Akram, M. (2015). Effects of Induced Molting on Semen Quality of Indigenous Chicken Aseel. *Pakistan J. Zool*, 47(4), 1199–1200.
- Jatoui, A. S., Iqbal, M., Sahota, A. W., Akram, M., Javed, K., Jaspal, M. H., Mehmood, S., Hussain, J., Hameed, T., & Khan, M. S. (2014). Comparative growth performance in four varieties of native Aseel chickens maintained in Pakistan. *Pakistan Journal of Zoology*, 46(6).
- Khan, M. S. (2004). Technical report on the status, trends, utilization and performance of FAnGR and their wild relatives in Pakistan. Faisalabad, Pakistan: University of Agriculture Faisalabad. <https://hdl.handle.net/10568/17236>
- Khan, M. T., Mahmud, A., Zahoor, I., & Javed, K. (2017). Organic and inorganic selenium in Aseel chicken diets: Effect on hatching traits. *Poultry Science*, 96(5), 1466–1472.

- Khan, M. T., Rehman, M. S., Abbas, M., Shafiq, M., Akram, M. A., Rauf, M., Gondal, M. A., Sharif, A., Raziq, F., & Bughio, E. (2021). Impact of Selenium-Supplemented Diets on Egg Morphometry and Quality in Four Varieties of Indigenous Aseel Chicken. *Brazilian Journal of Poultry Science*, 23(03), eRBCA-2020.
- Kim, N. Y., Jang, S. Y., Kim, S. J., Jeon, B. T., Oh, M. R., Kim, E. K., Seong, H. J., Tang, Y. J., Yun, Y. S., & Moon, S. H. (2017). Behavioral and vocal characteristics of laying hens under different housing and feeding conditions. *Journal of Animal & Plant Sciences*, 27(1).
- Kumar, M., Dahiya, S. P., & Ratwan, P. (2021). Backyard poultry farming in India: A tool for nutritional security and women empowerment. *Biological Rhythm Research*, 52(10), 1476–1491.
- Kumar, M., Dahiya, S. P., Sheoran, N., Ratwan, P., & Kumar, S. (2021). Appraisal of socio-economic profile and general knowledge of rural respondents about backyard poultry farming in northern India. *Indian Journal of Extension Education*, 57(1), 108–114.
- Lloyd, S., & Gibson, J. S. (2006). Haematology and biochemistry in healthy young pheasants and red-legged partridges and effects of spironucleosis on these parameters. *Avian Pathology*, 35(4), 335–340.
- Mahmood, S., Rehman, A. U., Khan, M. S., Lawal, R. A., & Hanotte, O. (2017). Phenotypic diversity among indigenous cockfighting (Aseel) chickens from Pakistan. *The Journal of Animal and Plant Sciences* 27(4):2017-1126.
- Miazi, O. F., Miah, G., Miazi, M. M., Uddin, M. M., Hassan, M. M., & Faridahsan, M. (2012). Fertility and hatchability of Fayoumi and Sonali chicks. *Scholarly Journal of Agricultural Science*, 2(5), 83–86.
- Ministry of Fisheries and Livestock. (2008). National Poultry Development Policy. Retrieved from <https://beezbistar.org/index.php/home/showAerticle/24/english/Beezbistar-Foundation/Study-on-Food-Safety-Governance-in-Poultry-Sector-Bangladesh>
- Mohan, J., Sastry, K. V. H., Moudgal, R. P., & Tyagi, J. S. (2008). Production and other characteristics of Aseel Peela desi hens under normal rearing system. *Indian Journal of Poultry Science*, 43(2), 217–219.
- Muneeb Z. (2021). Veterinary Consultant. <https://www.linkedin.com/pulse/aseel-chicken-breed-things-need-know-before-buying-muneeb-zahid/>
- Padhi, M. K. (2016). Importance of indigenous breeds of chicken for rural economy and their improvements for higher production performance. *Scientifica*, 2016(1), 2604685.
- Panda, B., & Mahapatra, C. M. (2012). Poultry production. New Delhi: ICAR Publications.
- Patra, B. N., & Bais, R. K. S. (2018). Phenotypic characterization of Aseel birds of Chhattisgarh. *Indian Journal of Animal Research*, 52(9), 1314–1317. <https://doi.org/10.18805/ijar.B-764>
- Ponte, P. I. P., Rosado, C. M. C., Crespo, J. P., Crespo, D. G., Mourão, J. L., Chaveiro-Soares, M. A., Bras, J. L. A., Mendes, I., Gama, L. T., & Prates, J. A. M. (2008). Pasture intake improves the performance and meat sensory attributes of free-range broilers. *Poultry Science*, 87(1), 71–79.
- Prabhu, S. N., Singh, A. P., Varghese, B. P., Dhama, K., Singh, S. D., & Singh, R. (2020). A comparative study of pathology and host immune response induced by very virulent infectious bursal disease virus in experimentally infected chickens of aseel and white leghorn breeds. *Vaccines*, 8(4), 1–19. <https://doi.org/10.3390/vaccines8040627>
- Rajkumar, U., Muthukumar, M., Haunshi, S., Niranjana, M., Raju, M., Rama Rao, S. V., & Chatterjee, R. N. (2016). Comparative evaluation of carcass traits and meat quality in native Aseel chickens and commercial broilers. *British Poultry Science*, 57(3), 339–347.
- Rajkumar, U., Rao, S. V. R., & Sharma, R. P. (2010). Backyard Poultry Farming changing the face of rural and tribal livelihoods. *Indian Farming*, 60(2).
- Rashid, A., Hassan, M. K., & Sardar, R. (2017). Status and management practices of Aseel chicken in rural areas of Punjab, Pakistan. *Pakistan Journal of Agricultural Research*, 30(3), 302–308
- Rehman, M. S., Mahmud, A., Mehmood, S., Pasha, T. N., Khan, M. T., & Hussain, J. (2018). Assessing behavior in Aseel pullets under free-range, part-time free-range, and cage system during growing phase. *Poultry Science*, 97(3), 725–732.
- Sarkar, K., & Bell, J. G. (2006). Potentialities of the indigenous chicken and its role in poverty alleviation and nutrition security for rural households. *INFPD Newsletter*, 16(215), 15–26.
- Sarkar, K., & Golam, M. (2009). A move from subsistence to semi-commercial family poultry farming with local chickens: effective strategies for family poultry in Bangladesh. *World's Poultry Science Journal*, 65(2), 251–259.
- Sarker, M. J. A., Bhuiyan, M. S. A., Faruque, M. O., Ali, M. A., & Lee, J. H. (2012). Phenotypic Characterization of Aseel Chicken of Bangladesh. *Korean Journal of Poultry Science*, 39(1), 9-15.
- Shanmathy, M., Tyagi, J. S., Gopi, M., Kolluri, G., Mohan, J., Sharma, S. K., Prabhakar, G., & Beulah, P. (2017). Effect of seasonal variation on respiration rate and core body temperature in Aseel and Kadaknath breed of chicken. *Indian Journal of Poultry Science*, 52(2), 189. <https://doi.org/10.5958/0974-8180.2017.00034.4>
- Singh, D. P. (2001). Aseel of India. Souvenir, National Seminar on Appropriate Poultry for Adverse Environment. Organized by Acharya NG Ranga Agricultural University and Project Directorate on Poultry, Hyderabad, 11th January.
- Singh, D. P. (2009). Overview of existing breeds and issues of conserving indigenous breeds. *Proceedings of National Workshop on Synthesizing Experiences in Promotion of Backyard Poultry*, Hyderabad, India, 54–55.
- Sonaiya, E. B. (2007). Family poultry, food security and the impact of HPAI. *World's Poultry Science Journal*, 63(1), 132–138.
- Usman, M., Ahmad, Z., Akram, M., Hussain, J., Mehmood, S., Shafiq, M., Rehman, A., Ahmad, S., & Iqbal, A. (2013). Pre and Post moult Productive performance of three age groups in four varieties of Aseel Chicken. *33rd Pakistan Congress of Zoology (International) Pakistan*, 355.
- Zia, W. M., Khaliq, A., Naveed, S., Hussain, J., Muhammad, N., & Ahmad, S. (2017). Comparative evaluation of influence of dietary organic and inorganic selenium supplement on growth performance of indigenous Aseel chickens. *Indian Journal of Animal Research*, 51(3), 478–488.