Journal of Sustainable Livestock
Volume 2, Number 2, 2026, pp. 92~101
https://doi.org/10.63859/jsl.v2i2.39
E-ISSN 3123-8963

Potential and Sustainability of KUB (Kampung Unggul Balitbangtan) Chicken Development in Indonesia: A Review

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Article Info

Article history:
Received June 30, 2026
Accepted August 24, 2026

Keywords:
Food security
Indigenous chicken
KUB chicken
Smallholder farming
Sustainability

ABSTRACT

The Kampung Unggul Balitbangtan (KUB) chicken is the first Indonesian native chicken systematically selected for egg production, released by the Ministry of Agriculture in 2014 after six generations of selection at the Indonesian Research Institute for Animal Production. This review synthesizes current evidence on the productive potential, economic contribution, and sustainability of KUB chicken development in Indonesia. KUB chickens lay 160–180 eggs hen^{-1} year^{-1} at a hen-day production of 45–50% (up to 60–65% at peak), reach 0.8–1.0 kg slaughter weight within 10–12 weeks, and show markedly reduced broodiness and lower mortality than unimproved kampung chickens. The second line, KUB-2, was further selected for higher egg output and yellow shank, improving carcass acceptability. Economically, KUB farming is more profitable than rearing unimproved native chickens (revenue–cost ratio ≈ 2.4 versus 1.7) and underpins several government poverty-alleviation and food-security programs. Across economic, ecological, and social dimensions, KUB farming shows strong sustainability, supported by adaptation to marginal and dry land, the use of local and agro-industrial by-product feeds, and strong community social capital. Nevertheless, high feed costs, disease pressure, an on-farm productivity gap, and weak genetic and seed stock management constrain sustainable scale-up. Strengthening biosecurity, local feed formulation, breeding-stock management, farmer institutions, and value-chain integration is therefore essential. KUB chicken offers a robust, locally adapted pathway toward sustainable smallholder poultry and national food sovereignty.

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INTRODUCTION

Native or village (kampung) chickens are a cornerstone of Indonesian smallholder agriculture, providing meat, eggs, household savings, and a buffer against economic risk for millions of rural families (1, 2). Indigenous chickens are valued for their adaptability to local environments, their tolerance of low-input management, and the premium price that consumers pay for their meat and eggs, which are widely preferred over those of

commercial broilers and layers (3), (4). With Indonesia's population reaching roughly 281.6 million in 2024 and per-capita protein demand rising steadily, native chickens' contribution to national food and nutrition security has become increasingly strategic (5).

Despite this importance, unimproved kampung chickens remain low-producing: slow growth, modest annual egg output, high broodiness, and high chick mortality limit their commercial potential (3), (6). To overcome these constraints, the Indonesian Research Institute for Animal Production (Balai Penelitian Ternak, Balitnak), under the Indonesian Agency for Agricultural Research and Development, conducted a long-term selection program that produced the Kampung Unggul Balitbangtan (KUB) chicken the first Indonesian native chicken selected specifically for egg production (7), (8). The Minister of Agriculture officially released KUB-1 for public use in 2014 (9), and a second improved line, KUB-2, was subsequently developed (10).

Since its release, KUB chicken has been disseminated across most provinces of Indonesia and has become a flagship of government programs for rural development, poverty alleviation, and food sovereignty (11, 12). However, realizing its full potential at the farmer level and doing so in a way that is economically, ecologically, and socially sustainable remains challenging. This paper reviews current evidence on the genetic background, productive and reproductive performance, economic contribution, and sustainability of KUB chicken, and discusses the principal constraints and strategic options for its sustainable development in Indonesia.

ORIGIN AND GENETIC DEVELOPMENT OF KUB CHICKEN

The KUB chicken originated from a base population of kampung chickens that was selected over six successive generations at Balitnak, Ciawi–Bogor (7), (8). The primary selection objective was to reduce broodiness, the prolonged incubation behavior that interrupts laying and depresses annual egg output, thereby shifting the population toward a layer-type performance (8). Molecular work supported selection against broodiness by using the prolactin promoter gene as a marker for marker-assisted selection, because the prolactin pathway plays a central role in the neuroendocrine cascade that triggers broodiness (13). As a result, KUB-1's incubation tendency was reduced to roughly 10% of the population, equivalent to an approximately 90% reduction relative to ordinary kampung chickens (8).

KUB-1 was formally released through the Decree of the Minister of Agriculture No. 274/Kpts/SR.120/2/2014 (9). A recognized limitation of KUB-1 was that about 64% of birds carried a black-based plumage, which is sometimes associated with a darker, less preferred carcass (10). To address this, KUB-2 was selected from the KUB-1 line for both higher egg production and yellow shank color; shank color is positively correlated with carcass skin color through the action of the yellow-skin gene, so selecting for yellow shank improves carcass acceptability (10, 14). Productivity of KUB-2 has been

documented at the fourth and sixth generations, confirming the stability of the improved layer performance and shank color (10), (15).

Beyond production traits, indigenous chicken lines such as KUB are of interest for their relatively robust innate immunity and disease tolerance, which contribute to lower mortality under smallholder conditions (16). These adaptive and genetic attributes position KUB chicken as a versatile dual-purpose breed that can be channeled toward either egg or meat enterprises, while retaining the hardiness characteristic of native poultry (7, 17).

PRODUCTIVE AND REPRODUCTIVE POTENTIAL

The defining advantage of KUB chicken is its substantially higher egg production. KUB hens lay about 160–180 eggs per year, with a hen-day production of 45–50% under good management, peaking at 60–65% (7), (8), (18). Hens reach first lay at approximately 164 days (about 22–24 weeks), with an initial egg weight near 30 g that increases to about 35–45 g as the flock matures (7), (19). For meat, KUB chickens attain 0.8–1.0 kg live weight within 10–12 weeks, with reported body weights of roughly 710 g at 60 days under intensive rearing (20), (21). Daily feed intake is typically 80–85 g, and the feed conversion ratio is approximately 3.8, reflecting the trade-off between hardiness and feed efficiency characteristic of native breeds (6). Comparative performance of KUB-1, KUB-2, and unimproved kampung chickens is summarised in Table 1, while Figure 1 illustrates the contrast in annual egg output and growth trajectory.

Table 1. Comparative productive and reproductive performance of KUB chicken and unimproved kampung chicken.

Trait	Unimproved kampung	KUB-1	KUB-2
Egg production (eggs hen^{-1} yr^{-1})	± 80–120	160–180	≥ 180
Hen-day production (%)	20–30	45–50 (peak 60–65)	47–50
Age at first egg (days)	± 180–210	± 164	± 160
Average egg weight (g)	35–40	35–45	38–45
Body weight at 10 weeks (g)	500–650	800–900	800–950
Feed intake (g day^{-1})	70–80	80–85	80–85
Feed conversion ratio	> 4.0	± 3.8	± 3.6–3.8
Broodiness/incubation (%)	± 90–100	± 10	± 10
Relative mortality	High	Low–moderate	Low–moderate

Note: values compiled from references (6,7,8,10,15,18–21); ranges reflect differences in management, generation, and agro-ecological conditions.

On-farm performance, however, is sensitive to the environment and management. Under hot, humid lowland conditions, egg productivity can fall well below genetic potential; for example, a study in East Nusa Tenggara recorded a hen-day production of only about 33.6% and higher mortality during the laying phase when ambient temperature averaged around 30 °C (22). Such variability underscores that the realized

potential of KUB chicken depends strongly on housing, thermal comfort, and the quality and quantity of feed provided (22, 23).

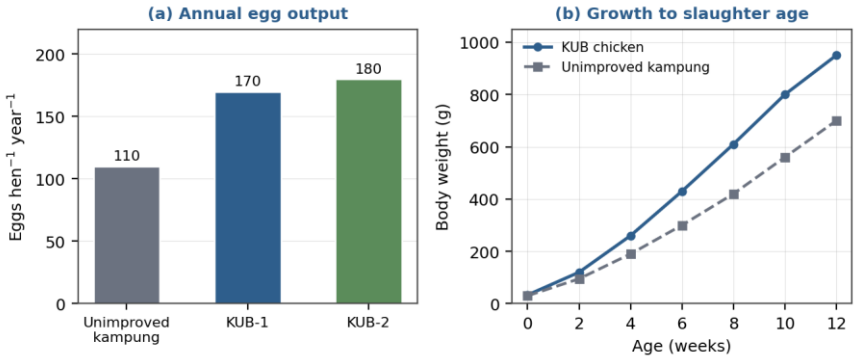

Figure 1. (a) Annual egg output and (b) growth to slaughter age of KUB chicken relative to unimproved kampung chicken (representative values from (6,7,10,15,20,21)).

ECONOMIC POTENTIAL AND CONTRIBUTION TO RURAL LIVELIHOODS

KUB chicken farming is consistently more profitable than rearing unimproved native chickens. Comparative analyses report a revenue–cost (R/C) ratio of about 2.38 for KUB chicken, compared with 1.72 for ordinary kampung chickens, indicating a substantially higher return per unit of input (3). The combination of a shorter production cycle, higher egg output, lower broodiness, and reduced mortality translates into faster cash turnover and improved enterprise viability for smallholders (3), (24). Table 2 summarises key economic indicators reported across regional studies.

Table 2. Selected economic indicators of KUB chicken farming reported in Indonesia.

Indicator/context	Reported finding	Source
Profitability (R/C ratio)	KUB 2.38 vs. unimproved kampung 1.72	(3)
Household income (poor families)	Net cash income from household-scale flocks; income source for low-income households	(12,24)
Government programmes	Component of poverty-alleviation and food-security schemes (e.g. native-chicken distribution to poor households)	(11,12)
Enterprise feasibility	Native-chicken businesses generally profitable; simple to raise and market	(1,25)
Market premium	Native chicken meat and eggs command higher prices than commercial poultry	(3,4)

Note: figures are context-specific and depend on flock size, feed source, and market access.

Because KUB chickens can be reared on a household scale with modest capital and locally available resources, the breed has become an instrument for rural poverty

alleviation and women's economic participation (11, 12). National and provincial programs have distributed day-old chicks and breeding stock and have organized farmer groups to multiply and disseminate KUB chicken across regions, from West Java and Central Java to eastern Indonesia (11, 26). Where farmers shift from extensive scavenging toward semi-intensive or intensive management, productivity and income rise further, allowing the enterprise to evolve from a subsistence activity into a small agribusiness (6), (25).

SUSTAINABILITY OF KUB CHICKEN FARMING SYSTEMS

Sustainability of KUB chicken development can be examined through the interacting economic, ecological, and social dimensions summarised in Figure 2. A study in Central Lombok, one of the principal KUB development centers, found that the business was reasonably sustainable across all three dimensions, although the strength of farmers' social capital still limited further growth (27).

Economic sustainability

Economically, the favorable R/C ratio, short production cycle, and premium market for native products support durable profitability (3), (27). Diversified outputs eggs, meat, and live breeding stock spread risk and provide multiple revenue streams, while low entry costs make the enterprise accessible to resource-poor households (12), (24).

Ecological sustainability

Ecologically, KUB chickens adapt well to dry and marginal land and to varied climates, enabling production in areas unsuitable for intensive commercial poultry (4), (28). Their tolerance of low-input systems allows the use of locally available and agro-industrial by-product feeds such as processed sago waste, golden snails, Moringa leaf meal, and crop residues, which lower both feed cost and the environmental footprint of production (28), (29), (30). Manure can be recycled as organic fertilizer by integrating poultry with crop and horticultural systems, thereby reinforcing circularity at the farm scale (27).

Social sustainability

Socially, KUB farming strengthens household food and nutrition security, generates rural employment, and engages women and smallholders in productive activity (11), (12). Strong networks, trust, and shared norms collectively constitute social capital and are decisive for the longevity of farmer groups and for the diffusion of breeding stock and good practices; investment in these institutions markedly improves the prospects for sustainable scaling (27).

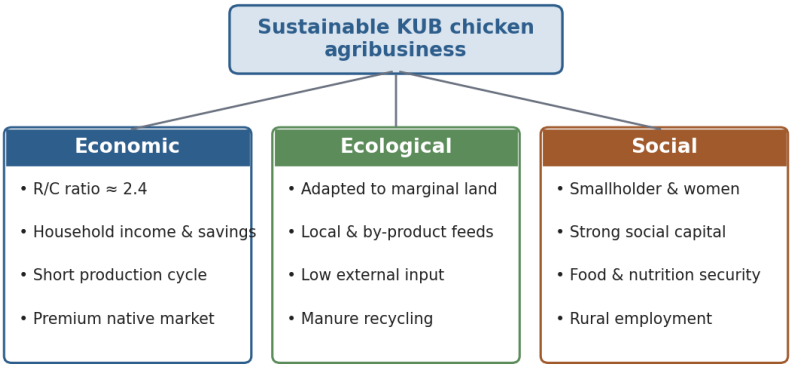

Figure 2. Three-pillar framework of sustainable KUB chicken agribusiness and its supporting attributes.

CONSTRAINTS TO SUSTAINABLE DEVELOPMENT

Several constraints continue to limit the sustainable scale-up of KUB chicken. The most frequently cited is the relatively high cost of feed, which dominates production costs and erodes margins, particularly where farmers rely on commercial rations (28), (31). Disease pressure is a second major risk: surveys of smallholder flocks in Central Java found high prevalence of infectious coryza (snot, 44%) alongside Newcastle disease, infectious bursal disease, coccidiosis, and salmonellosis, with substantial mortality and economic loss when biosecurity and nutrition are inadequate (32). Although KUB chickens are comparatively hardy, they are not immune to these endemic poultry diseases (32).

A third constraint is the gap between the breed's genetic potential and its realized on-farm performance, driven by suboptimal feeding, housing, and thermal management (22, 23). Fourth, weak management of breeding and seed stock uncontrolled crossing, inbreeding, and the circulation of unselected or mislabelled birds threatens the genetic integrity and uniformity of disseminated KUB chickens (10), (15). Finally, limited farmer organization, recording, market access, and extension support constrain the transition from subsistence rearing to a reliable, market-oriented agribusiness (25), (27). Table 3 maps the principal constraints and corresponding strategic interventions.

Table 3. Key constraints and strategic interventions for sustainable KUB chicken development.

Constraint	Strategic intervention
High feed cost	Local and by-product feed formulation; feed enzymes; on-farm forage and insect protein
Disease and mortality	Biosecurity, routine vaccination (e.g. Newcastle disease), sanitation, early detection

Constraint	Strategic intervention
On-farm productivity gap	Improved housing and thermal comfort; balanced rations; capacity building and extension
Genetic dilution and weak seed stock	Line maintenance, controlled breeding, certified day-old chicks, inbreeding avoidance
Weak institutions and market access	Strengthen farmer groups and social capital; recording; branding and value-chain linkage

STRATEGIES AND FUTURE PROSPECTS

Realizing the sustainable potential of KUB chicken requires coordinated action across the technical, institutional, and policy domains. At the farm level, lowering feed costs through locally formulated, by-product-based diets complemented by feed additives such as the BS4 enzyme to improve feed efficiency in laying KUB hens can substantially increase profitability without compromising performance (28), (33). Strengthening biosecurity and routine vaccination, especially against Newcastle disease and infectious coryza, is essential to reduce the heavy disease burden documented at the farmer level (32).

Maintaining genetic quality is equally important. Disciplined line maintenance at source institutions, controlled multiplication, distribution of certified day-old chicks, and avoidance of inbreeding are needed to preserve the productivity and uniformity that distinguish KUB and KUB-2 from ordinary kampung chickens (10), (15), (17). Institutionally, building farmer groups, improving record-keeping, and developing market linkages and product branding can convert dispersed household flocks into competitive enterprises and capture the price premium attached to native poultry products (25), (27).

At the policy level, continued integration of KUB chicken into national food-security, poverty-alleviation, and rural-development agendas backed by extension services and access to credit can accelerate adoption while keeping the system inclusive and locally adapted (11), (12). Future research should prioritize robust on-farm performance under tropical heat stress, low-cost climate-resilient housing, the genetic basis of disease resistance, and full life-cycle assessments of the environmental footprint of KUB systems, so that scale-up proceeds on a sound sustainability footing (16), (22), (23).

CONCLUSION

KUB chicken represents a successful application of indigenous animal genetic improvement to the needs of Indonesian smallholders. Selected over six generations for reduced broodiness and higher egg production, and further refined as KUB-2 for egg output and carcass acceptability, the breed delivers 160–180 eggs hen^{-1} year^{-1} and reaches market weight within 10–12 weeks while retaining the hardiness of native

poultry. Its favorable profitability, adaptability to marginal land, compatibility with local feed resources, and strong social embedding give it good economic, ecological, and social sustainability. The main barriers high feed cost, disease pressure, an on-farm productivity gap, and weak genetic and institutional management are tractable through better feeding, biosecurity, breeding-stock control, and farmer organization. With coordinated technical, institutional, and policy support, KUB chicken offers a robust and locally grounded pathway toward sustainable smallholder poultry production and national food sovereignty in Indonesia.

ACKNOWLEDGEMENTS

The authors thank the Faculty of Animal Science, Universitas Wijayakusuma Purwokerto, for institutional support, and acknowledge the researchers of the Indonesian Research Institute for Animal Production whose work on KUB chicken provided the foundation for this review.

AUTHOR CONTRIBUTIONS

D.D.P. conceived and designed the review and drafted the manuscript; D.D.P. and S.H. performed the literature search and data synthesis; F.D.E. and S.H. critically revised the manuscript for important intellectual content; all authors read and approved the final manuscript.

FUNDING

This review received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article, as no new data were created; all data discussed in this review are available in the published studies cited in the References.

REFERENCES

1. Henuk YL, Bakti D. Improvement of native chicken production in Indonesia. In: Proceedings of the National Seminar on Animal Husbandry and Veterinary Technology. Bogor: ICARD; 2018. p. 1–10.
2. FAO. Poultry development review: smallholder poultry and rural livelihoods. Rome: Food and Agriculture Organization of the United Nations; 2014.
3. Sujionohadi K, Setiawan I, Iskandar S. Native chicken production in Indonesia: a review. J Anim Sci Technol Indones. 2022;10(2):112–124.
4. Nataamijaya AG. The native chickens of Indonesia: their potential and development. Indones Bull Anim Vet Sci. 2010;20(2):93–104.

5. Sutopo S, Kurnianto E, Setiaji A. Challenges and constraints to the sustainability of poultry farming in Indonesia. Anim Biosci. 2024;37(5):901–913. doi:10.5713/ab.23.0409
6. Setiawan I, Mahmud A, Rusdiana S. Constraints and benefits of KUB chicken cultivation in Central Java Province, Indonesia. E3S Web Conf. 2021;306:02027. doi:10.1051/e3sconf/202130602027
7. Iskandar S, Sartika T. KUB chicken: the first Indonesian kampung chicken selected for egg production. In: Proceedings of the 16th AAAP Animal Science Congress, Vol. II. Yogyakarta: Universitas Gadjah Mada; 2014. p. 157–160.
8. Sartika T, Iskandar S, Tiesnamurti B. Sumberdaya genetik ayam lokal Indonesia dan prospek pengembangannya [Indonesian local chicken genetic resources and their development prospects]. Bogor: IAARD Press; 2016. 177 p.
9. Ministry of Agriculture of the Republic of Indonesia. Keputusan Menteri Pertanian No. 274/Kpts/SR.120/2/2014 tentang Pelepasan Galur Ayam KUB-1 [Decree on the release of the KUB-1 chicken line]. Jakarta: Directorate General of Livestock and Animal Health Services; 2014.
10. Sartika T, Iskandar S. The productivity of 4th generation KUB-2 chicken. J Ilmu Ternak Vet (JITV). 2019;24(4):151–157. doi:10.14334/jitv.v24i4.2033
11. Komarudin K, Resnawati H, Sartika T. Spatial dissemination of day-old local chicken in the KUB development programme, West Java, Indonesia. IOP Conf Ser Earth Environ Sci. 2021;788:012112.
12. Saleh K, Bahri S, Rusdiana S. Additional income for poor families through native chicken (KUB and Sensi) farming development in Gorontalo Province. IOP Conf Ser Earth Environ Sci. 2021;892:012090.
13. Sartika T, Duryadi D, Mansjoer SS, Saefuddin A, Martojo H. Prolactin promoter gene as marker assisted selection (MAS) for the control of broodiness of kampung chicken. J Ilmu Ternak Vet (JITV). 2004;9(4):239–245.
14. Eriksson J, Larson G, Gunnarsson U, Bed'hom B, Tixier-Boichard M, Strömstedt L, et al. Identification of the yellow skin gene reveals a hybrid origin of the domestic chicken. PLoS Genet. 2008;4(2):e1000010. doi:10.1371/journal.pgen.1000010
15. Komarudin K, Sartika T, Pratiwi N, Kostaman T. Growth performance of 6th generation KUB-2 chicken. IOP Conf Ser Earth Environ Sci. 2021;888:012015. doi:10.1088/1755-1315/888/1/012015
16. Wang Y, Lan X, Zhang H. A heterophil/lymphocyte-selected population reveals the phosphatase PTPRJ is associated with immune defence in chickens. Nat Commun. 2023;14:680. doi:10.1038/s41467-023-36406-2
17. Insani GA, Maharani D, Sasongko H. Reproduction and growth performance of Kampung Unggul Balitbangtan (KUB) chicken cross. Bull Anim Sci. 2022;46(3):150–158.
18. Sartika T, Iskandar S, Zainuddin D. The development of a newly formed superior local chicken in Indonesia: a review. J Southwest Jiaotong Univ. 2021;56(5):512–525.
19. Urfa S, Indrijani H, Tanwiriah W. Model kurva pertumbuhan ayam kampung unggul Balitnak (KUB) umur 0–12 minggu [Growth curve model of KUB chicken aged 0–12 weeks]. J Ilmu Ternak. 2017;17(1):59–66.
20. Pratama AA, Libriani R, Pagala MA. Body weight and morphometric characteristics of KUB chicken at 60 days of age. J Biol Trop. 2024;24(2):710–718.

21. Sartika T. Panen ayam kampung umur 70 hari [Harvesting kampung chicken at 70 days]. Jakarta: Penebar Swadaya; 2016.
22. Ratnawaty S, Bira GF, Hosang EY. The effect of environmental factors on the productivity of KUB chicken in Nusa Tenggara Timur. IOP Conf Ser Earth Environ Sci. 2021;807:032045. doi:10.1088/1755-1315/807/3/032045
23. Iskandar S, Hidayat C, Sartika T, Resnawati H. Optimizing dietary energy and protein for growing KUB chicken in supporting maximum egg production. In: Proceedings of the International Seminar on Livestock Production and Veterinary Technology. Bogor: ICARD; 2014. p. 159–164.
24. Rahayu BWI, Sumardi D, Widayati TW. Income of chicken KUB business at the Flores Bajawa Agricultural College. Int J Life Sci Agric Res. 2024;3(12):980–987.
25. Mandey JS, Untu IM, Rembet GDG. Profit analysis of native chicken farming business in Kakas District, Minahasa Regency, Indonesia. IOP Conf Ser Earth Environ Sci. 2024;1341:012110.
26. Ekalinda O, Zurriyati Y. Budidaya ayam KUB (ayam kampung unggul Balitbangtan) [KUB chicken husbandry]. Jakarta: IAARD, Ministry of Agriculture; 2019.
27. Suryani NN, Sukanten W, Mahardika IG. Sustainability of KUB chicken raising business in Central Lombok Regency of Indonesia: a social capital perspective. J Sustain Agric Livest. 2022;37(2):201–214.
28. Harnanik S, Wiraswati R. Performance of KUB chicken on household-scale semi-intensive maintenance in the swamp agro-ecosystem of Ogan Komering Ilir District. KaliAgri J. 2021;3(2):45–53.
29. Rosningsih S, Amin L. Concentrated feed based on golden snails reduces KUB chickens' production costs in the Sawung Maju Berbah farmer group, Sleman Regency. In: Proceedings of the National Seminar Series 7. Yogyakarta; 2017. p. 487–499.
30. Harnani A, Yusuf M, Subiharta. The utilization of local feed ingredients and Moringa leaf flour supplementation in KUB chickens: impacts on growth, egg production, and meat quality. Adv Anim Vet Sci. 2023;11(4):615–624.
31. Subiharta, Prasetyo D, Hartono M. Constraints and benefits of KUB chicken cultivation at the household level in West Nusa Tenggara. J Trop Anim Prod. 2021;22(1):20–29.
32. Prasetianti D, Ariningsih E, Kusnadi N. Identification of disease cases in KUB chicken on farmers' henhouses in Central Java. J Indones Trop Anim Agric. 2024;49(2):130–139.
33. Sinurat AP, Haryati T, Pasaribu T, Sartika T, Gunadi. Effectivity of BS4 enzyme as antibiotic growth promoter substitute to improve feed efficiency in laying KUB hens. J Ilmu Ternak Vet (JITV). 2018;23(1):1–9.
34. Badan Pusat Statistik (BPS). Produksi daging ayam buras menurut provinsi [Native chicken meat production by province]. Jakarta: BPS-Statistics Indonesia; 2024.
35. Iskandar S, Hidayat C, Cahyaningsih T. The effect of feeding pre-starter on the performance efficiency of local chicken (KUB chicken). J Ilmu Ternak Vet (JITV). 2014;19(3):203–209. doi:10.14334/jitv.v19i3.1083
36. Hidayat C, Iskandar S, Sartika T. Carcass characteristics and meat quality of KUB chicken under intensive rearing. Indones Bull Anim Vet Sci. 2017;27(2):85–93.