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An Assessment of Samae Dam Chicken (*Gallus gallus*) Production and Technology Transfer for Community Economic Development

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Abstract

The objectives of this study were to evaluate the production performance of Samae Dam chickens during 0–8 weeks of age, compare production efficiency between farmers participating and not participating in the technology transfer program, determine the physical and chemical composition of Samae Dam chicken meat, and promote technology transfer for Samae Dam chicken production to support community economic development in Uthai Thani Province, Thailand. The methodology comprised two parts: secondary data collection and field research. Participants included 20 farmers in the technology transfer program and 10 farmers in a non-participating comparison group. Data were gathered through in-depth interviews, focus group discussions, participatory observation, and on-farm records. Statistical analysis, including Analysis of Variance (ANOVA) and Generalized Linear Models (GLM) via SAS software, was used to compare production efficiency between the two groups. The production performance of approximately 200 Samae Dam (*Gallus gallus*) chickens aged 0–8 weeks was evaluated based on average daily gain (ADG), feed conversion ratio (FCR), feed intake, and body weight gain. For males and females, respectively, the ADG at ages 0–3, 3–6, 6–8, and 0–8 weeks were 12.22 and 11.11 g/d, 32.22 and 20.00 g/d, 35.00 and 33.33 g/d, and 14.58 and 13.33 g/d. The corresponding FCR values for males and females at 0–3, 3–6, 6–8, and 0–8 weeks were 2.45 and 2.70, 1.24 and 2.00, 1.40 and 1.50, and 3.42 and 3.75, respectively. Feed intake for males and females at 0–3, 3–6, 6–8, and 0–8 weeks was 30, 40, 50, and 120 g/d, respectively. Body weight gain for males and females at 0–3, 3–6, 6–8, and 0–8 weeks was 1,100 and 1,000 g/head, 1,900 and 1,800 g/head, 2,100 and 2,000 g/head, and 3,500 and 3,200 g/head, respectively. Chemical analysis of the meat revealed high protein (29.50–32.27%) and low fat content (2.43–10.42%). Regarding farming efficiency, no statistically significant differences ($P>0.05$) were found in ADG, FCR, or feed intake between participating and non-participating farmers. The study concludes that Samae Dam (*Gallus gallus*) chickens possess strong production potential and desirable meat quality. Furthermore, technology transfer and training programs can enhance farmers' knowledge and efficiency, fostering increased income and sustainable community economic development.

Keywords: Development, Community, Technology transfer, Samae Dam (*Gallus gallus*) Chicken

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Introduction

Thai Native chickens are generally raised in rural villages, where they forage naturally. There are not many of these chickens in the entire province, approximately 1,000 of them, located locally (Abdelqader, 2007; Bett et al., 2014). Consequently, these chickens develop high physical endurance and integrity from birth. Chicks typically follow their mothers to scavenge for food and adapt well to their environment. As a result, they are kept by almost every household in humid tropical regions. The distinguishing feature of this breed is its completely black coloration, from the beak and legs to the claws, and its glossy, silk-like feathers. Furthermore, Demeke (2003) and Javed et al. (2003) found that native chickens can withstand stress and various diseases. Nevertheless, epidemics typically occur during two periods: March to May and the 'late rainy season' between October and November, particularly involving hemorrhagic diseases. Epidemics in poultry typically occur during two primary periods: March to May and October to November. Specifically, hemorrhagic diseases often peak during the "late rainy season" around October. (Abdelqader, 2007; Henning et al., 2006; Das, 2010) In the past, training farmers to raise indigenous Samae Dam chickens has successfully boosted local incomes. However, Mapiye & Sibanda (2005) observed a decline in chicken size due to traditional breeding practices: farmers often consume or sell the larger birds and keep smaller ones for breeding, leading to inbreeding and reduced physical stature. To address this, there is a significant need to promote Samae Dam chicken farming as a primary occupation for economic development. The Samae Dam breed is highly valued for its distinctive characteristics, including tender meat, black plumage, and black legs, as well as its long history and premium market price (Ahlers et al., 2009; Dana et al., 2010). Therefore, research into developing Samae Dam hybrid breeds is essential. This includes technology transfer, career promotion, and the establishment of learning networks to strengthen Community Enterprises for long-term sustainability (Chantong & Kaneene, 2011; Cabarles, 2013). Previous studies on indigenous chicken breeds in Thailand have highlighted their adaptability, disease resistance, and suitability for smallholder farming systems (FAO. 2014; Kong et al., 2006). In addition, research on native chicken production systems has emphasized the importance of improved feeding strategies, genetic selection, and management practices in enhancing growth performance and economic returns (Magothe et al 2010; Chankong & Chuaychu-noo, 2021). However, limited studies have specifically focused on the production performance, meat quality, and economic potential of Samae Dam chickens in a community-based development context. (Dorji et al. 2011; Frankham & Briscoe, 2002; Okeno et al 2013) Therefore, this study aims to address this research gap by integrating production, economic, and social dimensions. Data will be collected on chicken growth performance, including average daily gain (ADG), feed conversion ratio (FCR), feed intake, and body weight gain, as well as meat quality characteristics. In addition, information on farming practices will be gathered from farmers through in-depth interviews, focus group discussions, and field observations

This research aims to transfer technology and promote the production of Samae Dam chicken breeds to enhance economic development and community income in Uthai Thani Province.

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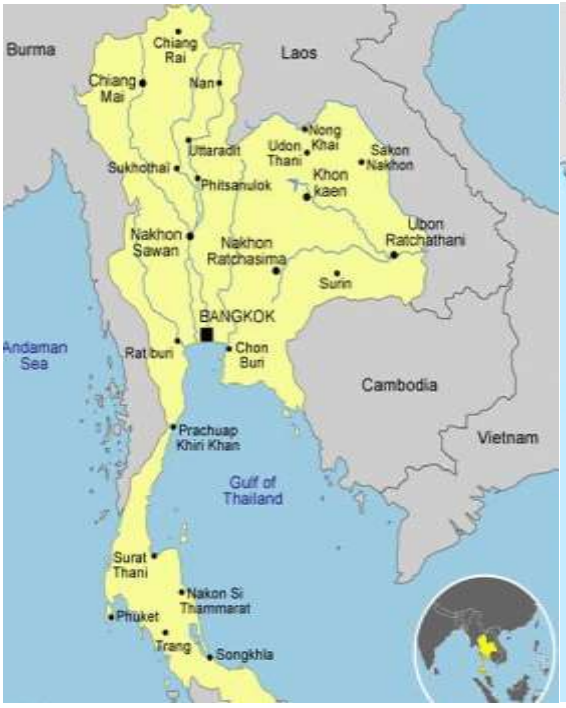


Figure 1 Shows the location of Thailand.



Figure 2 Shows the location of Uthai Thani province of Thailand

Methodology

This study was conducted in Uthai Thani Province, located in the lower northern region of Thailand. The research area consisted of 10 villages where local farmers commonly raise indigenous Samae Dam chickens. The study population consisted of small-scale farmers raising Samae Dam chickens in the selected villages. A total of 30 farmers were included in the study. Among them, 20 farmers participated in the technology transfer program, while 10 farmers who did not participate served as a comparison group. Farmers were selected using purposive sampling based on their experience in raising Samae Dam chickens and their willingness to participate in the research project. In addition, approximately 200 Samae Dam chickens aged 0–8 weeks were evaluated to determine production performance, including average daily gain (ADG), feed conversion ratio (FCR), feed intake, and body weight gain.

This trial was reviewed through funding and animal ethics and conducted by a committee for scientific work experimentation with NSRUIACUC No 202006 Certificate, subject : Technology Transfer and Promotion of Samae Dam Chicken (*Gallus gallus*) Production for Development Community Income. Technology transfer of Samae Dam breeding chickens to promote a career in Samae Dam breeding chicken production continuously promotes people's self-reliance ability in the community. Bring the knowledge gained to be transferred and disseminated to achieve sustainable benefits for themselves and the earth. Network users and interested parties can exchange knowledge and continuously and sustainably expand the project's research results.

Operation procedure

Study area

This study was conducted in Uthai Thani Province, Thailand. A total of 30 farmers from 10 villages who raised Samae Dam chickens were included in the study. Among them, 20 farmers participated in the technology transfer program, and 10 farmers did not participate, serving as a comparison group. The production performance of approximately 200 Samae Dam

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chickens aged 0–8 weeks was evaluated, including average daily gain, feed conversion ratio, feed intake, and body weight gain.

They met with community leaders to assess the need for promoting Samae Dam chicken production as a livelihood activity. The project will recruit farmers interested in participating in the project. Preparation and training of farmers to execute and monitor projects. Researchers will monitor and conduct consultations for local farmers throughout the project period. Organizing other technology transfer training that can extend from raising chickens and establishing a learning resource group and a network of chicken breeders of Samae Dam, the selection farmers are already raising Samae Dam chicken breeds, and collecting information. Before conducting research using questionnaires and interviews, arrange training on follow-up on-farm improvements according to the requirements. Visit the project network farms with network farmers every two months. Records are used for comparative analysis of the farming efficiency of participants and non-participating farmers of raising the Samae Dam chicken breeding career.

Sampling procedure

Farmers were selected using purposive sampling from communities that raise Samae Dam chickens in Uthai Thani Province. The selection criteria included farmers with experience in raising indigenous chickens and a willingness to participate in the research project.

Feeding and management

Samae Dam chickens were raised under a semi-intensive management system by local farmers. During the starter period (0–3 weeks), chicks were fed a commercial starter diet containing approximately 20–22% crude protein. During the grower period (3–8 weeks), chickens received grower feed containing about 18–20% crude protein. Feed and clean drinking water were provided ad libitum. The chickens were housed in simple poultry houses with natural ventilation and litter flooring. Routine management practices included sanitation, disease prevention, and regular monitoring of health and growth performance.

Calculation formula

$$\text{Dressing percentage (\%)} = \left(\frac{\text{Carcass weight}}{\text{Live body weight}}\right) \times 100$$

$$\text{Net return} = \text{Total revenue} - \text{Total production cost}$$

$$\text{Benefit–Cost Ratio (BCR)} = \text{Total revenue} / \text{Total production cost}$$

Research instruments

The research instruments included structured questionnaires, in-depth interviews, and focus group discussions. The questionnaire was developed based on the research objectives and relevant literature. Before data collection, the questionnaire was pre-tested with a small group of farmers to ensure clarity and reliability. The reliability of the instrument was assessed using Cronbach's alpha. In addition, consumer acceptance of Samae Dam chicken meat (breast and thigh) was evaluated through a sensory test conducted by untrained consumers (n = 200) who were regular chicken consumers. Participants were selected using purposive sampling based on their consumption experience. A 9-point hedonic scale (1 = dislike extremely, 9 = like extremely) was used to assess sensory attributes, including appearance, color, texture, flavor, and overall acceptability. Samples were coded and randomly presented under controlled conditions to minimize bias.

Data collection

Doing this research to get the most comprehensive and complete information, the research team has set the procedures and methods of data collection into two parts: 1) Secondary Data Collection (Secondary Data), which collects information from various

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documents. 2) Collecting field data (Field Research), including qualitative data collection. This research used in-depth interviews and focus group meetings, complete and complete.

Impact Assessment Framework

Impact assessment was conducted across three dimensions:

1. Economic impact: income generation, production cost reduction, and market access
2. Social impact: community participation, knowledge transfer, and network development
3. Environmental impact: utilization of local resources, waste management, and sustainability practices

Each dimension was evaluated using Likert-scale questionnaires and supplemented by qualitative data from in-depth interviews and focus group discussions.

Data analysis

Statistical evaluation was performed using the SPSS statistical software (SPSS, 1999). Analyze the general information of the interviewees by frequency distribution and percentage for data analysis using all types of information obtained from in-depth interviews and small group meetings on career opinions and career promotion guidelines. In addition, qualitative research was used to study and collect data on academic documents and textbooks, and to collect field study data. The study tool was in-depth interviews, group discussion, Participatory Observation, Educational Population Descriptive methods, and content analysis. Data collection from in-depth interviews. Participant observation and a sample conversation analysis are the primary triangulation methods for qualitative data analysis, including a systematic research process to build the study's credibility. Statistical evaluation was performed using the SAS statistical software (Statistical Analysis System, v 9.4; SAS Institute, Cary, NC, USA). Analysis of variance and generalized linear models were used in evaluating the individual effects (Influence of participating groups and non-participating groups on the production efficiency of Samae Dam chicken breeds) Subsequently, the following indicators were calculated and evaluated: least-squares means, standard deviations, standard errors of the means (SEM), and P-value (while setting statistical significance at $\alpha = 0.05$).

Results

Technology transfer and production efficiency of Samae Dam chicken breeds in Uthai Thani province revealed that Samae Dam chicken production efficiency in terms of average daily gain male and female, age ranges 0-3, 3-6, 6-8 and 0-8 weeks were 12.22 and 11.11 g/d, 32.22 and 20 g/d, 35.00 and 33.33 g/d, 14.58 and 13.33 g/ respectively in terms of feed conversion ratio male and female, aged 0-3, 3-6, 6-8 and 0-8 weeks were 2.45 and 2.70, 1.24 and 2, 1.40 and 1.50, 3.42 and 3.75, respectively. Males and females, age ranges 0-3, 3-6, 6-8 and 0-8 weeks are 30 and 30 g/d, 40 and 40 g/d, 50 and 50 g/d, 120 and 120 g/ respectively, in terms of body weight gain male and female, age ranges 0-3, 3-6, 6-8 and 0-8 weeks are 1,100 and 1,000 g/head/day, 1,900 and 1,800 g/head/day, 2,100 and 2,000 g/head/day, 3,500 and 3,200 g/head/day respectively, as shown in Table 1

Comparison of sex characteristics to physical characteristics and chemical composition of meat of Samae Dam breed chickens, physical characteristics found that L*(Lightness) was 42.152 - 48.734, a*(Redness) was -(1.218) - 3.022, b*(Yellowness) was 2.814-7.946, and the meat's water content was 23.342-107.845. The average texture of chicken meat was 2.007-5.920 for the chemical composition of the meat of have protein levels 29.502-32.265 % and low fat 2.43-10.42% as in Table 2 Promotion of Samae Dam Chicken Production Occupation in Uthai Thani Province to promote the body of knowledge to increase the efficiency of

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development and create a career to grow income add value to products knowledge enhancement. There is a context suitable for the problems and needs of each area—the local resource database system. The community has expanded the availability of products to sell more. There is a career, and income in the community is concentrated. To strengthen the community, gets the poverty must be resolved. The community has a shared sense of being a local community, love, solidarity, and understanding of rights. There is a good network and relationship between universities, communities, and related agencies. The development of local economies achievement through family income products that live according to the Sufficiency Economic Philosophy. Utilizing local resource activities to promote community careers. Local resource activities to promote community careers. For the farming efficiency of the farmers who participated and did not participate in the project, the average daily gain, feed conversion ratio, and feed intake difference were not statistically significant (P>0.05). However, the study of participants in the project farmers showed a statistically significant difference in body weight gain compared to those who did not participate in the program (P <0.05), as shown in Table 3.

Table 1 Shows the comparison of sex characteristics to the average daily gain (ADG: g/h/d), feed conversion ratio (FCR), feed intake (FI: g/h/d), and body weight gain (BWG: g/h/d) of the Samae Dam chicken breed

Age/Month	ADG: g/h/d		FCR		FI: g/h/d		BWG: g/h/d	
	Cock	Hen	Cock	Hen	Cock	Hen	Cock	Hen
0-3	12.22	11.11	2.45	2.70	30	30	1,100	1,000
3-6	32.22	20.00	1.24	2.00	40	40	1,900	1,800
6-8	35.00	33.33	1.40	1.50	50	50	2,100	2,000
0-8	14.58	13.33	3.42	3.75	120	120	3,500	3,200

Note: The comparison of means showed no statistically significant difference at P>0.05.

Table 2 Presents a comparison of sex characteristics, physical characteristics, and chemical composition of the meat of the Samae Dam chicken

Item	Cock		Hen	
	Breast	Loin	Breast	Loin
Physical appearance				
L*(Lightness)	44.548	42.152	48.432	48.734
a*(Redness)	-0.306	3.022	-1.218	2.78
b*(Yellowness)	5.92	4.186	7.946	2.814
Holding capacity of the meat	31.170	23.342	82.831	107.845
Texture of the chicken meat				
Hardness	6.042	5.164	4.375	4.002
Springiness	0.828	0.732	0.770	0.852
Cohesiveness	0.453	0.542	0.429	0.517
Chewiness	2.521	1.682	1.384	1.857
Average	2.425	2.007	5.920	5.824
Chemical composition of meat (%)				
moisture	9.15	9.11	9.06	9.03
protein	31.228	30.032	32.265	29.502
fat	2.43	10.42	2.16	9.14

Note: The comparison of means showed no statistically significant difference at P>0.05.

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Figure 3 Shows the atmosphere of technology transfer and promotion



Figure 4 Shows the members who participated in the Samae Dam chicken breeding career promotion project



Figure 5 Shows the visit to evaluate the farmer's raising efficiency of Samae Dam chickens.

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Figure 6 Shows the condition of raising Samae Dam chickens by farmers.

Table 3 Shows the efficiency of raising Samae Dam breed chickens at the age of 0-8 months of farmers who participated and didn't participate in the technology transfer project, and Samae Dam chicken production performance in Uthai Thani province

Average Performance	Group not Participating				Join Group				P-valve
	Mean	Min	Mix	SEM	Mean	Min	Mix	SEM	
Average Daily Gain (g/h/d)	12.00	10.0	14.00	1.30	14.0	13.33	14.58	0.74	0.083
Feed Conversion Ratio	3.80	3.6	4.00	0.25	3.50	3.42	3.75	0.03	0.221
Feed Intake (g/h/d)	100.00	80.0	120.00	25.90	120.00	115.00	125.00	17.21	0.570
Body Weight Gain (g/h/d)	3,000 [b]	2,80	3,200	30.08	3,300 [a]	3,200	3,500	29.05	0.033

Note: [a-b] effects were considered significant at P<0.05, SEM = Standard Error of the Mean

Discussions

Technology transfer and production efficiency of Samae Dam chicken breeds in Uthai Thani Province are closely associated with community development processes. Community development refers to the process of enhancing the capacity of individuals and groups within a community to work collaboratively in improving their livelihoods in accordance with established plans and projects (Mekchay et al., 2014). This process involves both internal community empowerment and external support (Moreki et al., 2010). Norris et al. (1997) emphasized that a key goal of community development is to improve individuals' quality of life and well-being, as reflected in their ability to perform tasks effectively and efficiently, maintain good health, and demonstrate ethical behavior. According to Wiratsudakul et al., (2014) successful community development is guided by the principle known as "TERMS," which consists of Technology (appropriate local tools), Economy (stable income and livelihood), Resources (balanced and sustainable natural resources), Mental (strong physical and mental health), and Socio-cultural (unity, shared values, and cooperation). Regarding farming efficiency, no statistically significant differences were observed between participating and non-participating farmers in terms of average daily gain, feed conversion ratio, and feed intake ($P > 0.05$). However, body weight gain was significantly higher among farmers who participated in the project ($P < 0.05$), as shown in Table 3. Traditional chicken farming practices are commonly based on the use of food scraps or agricultural residues, which are typically low in nutritional value. This results in slower growth rates and leads farmers to

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perceive native chicken farming as economically unviable, prompting them to shift to other occupations with quicker returns. In addition, marketing systems are largely dependent on middlemen, as farmers tend to sell chickens only when traders visit the community, without accessing external markets. This results in price suppression and reduced profitability (Javed et al., 2003; Pakarat, 2018; Dana et al., 2010). Similarly, Badubi (2006) reported that indigenous chicken production in Phayao Province faced challenges related to feed and marketing management. Most farmers practiced semi-intensive systems, using locally available feed resources such as corn and paddy without proper formulation. Marketing channels were limited, with a large proportion of farmers selling chickens to intermediaries. Technology transfer plays a crucial role in improving production efficiency. Training programs conducted by the government and related agencies provide farmers with knowledge on breeding selection, feeding management, supplementation, sanitation, and disease prevention. The use of simple, accessible manuals further enhances the ability of farmers to apply these practices in their local context (Plaengkaew et al., 2021; Sharma et al., 2022). The promotion of Samae Dam chicken farming in Uthai Thani Province has encouraged farmers to utilize local feed resources, thereby reducing production costs. This approach also improves meat quality and creates opportunities for value-added products and access to higher-value markets (Bungsrisawat, 2018; Cabarles, 2013). Furthermore, integrating local wisdom with modern agricultural technologies strengthens community-based economic development and supports long-term sustainability (Rizzi et al., 2013; Sittivongsa, 2024). Previous studies, Henning et al (2006); Tadelle et al. (2003), indicated that major constraints in native chicken farming include limited knowledge in breeding, feeding, and disease management. Therefore, capacity-building programs and market development at the provincial level are essential for improving production systems and enhancing farmer income. Selection and conservation of native chicken breeds, together with Good Farming Management (GFM) practices, are key success factors in improving productivity and income. Integrating local knowledge with modern technology enables farmers to transition from traditional free-range systems to semi-intensive systems, combining locally available feed with commercial feed to improve growth performance and profitability (Tompić et al 2011; Tongsiri et al 2019; Van der Werf, 2022). When compared with other indigenous chicken breeds reported in previous studies, Samae Dam chickens exhibit comparable growth performance and adaptability under semi-intensive production systems. For example, Siriwadee et al. (2023) reported lower average daily gain and less efficient feed conversion under traditional systems, suggesting that improved feeding strategies in the present study contributed to better performance. In terms of economic analysis, the cost–return structure observed in this study is consistent with (Suwanasopee et al., 2019; Suyatno et al., 2023), who found that profitability depends heavily on feed cost management and market access. However, the integration of technology transfer in this study appears to enhance economic efficiency and income stability among participating farmers. Regarding carcass and meat quality, Samae Dam chickens demonstrated high protein content and relatively low fat levels, which are comparable to or better than those of other native breeds. These characteristics may provide a competitive advantage in niche markets that demand lean and high-quality meat (Jaturasitha et al., 2008; Kong et al., 2006). In terms of consumer acceptance, previous studies indicate that indigenous chicken meat is preferred for its texture and flavor. The results of this study suggest that Samae Dam chicken has strong potential to meet consumer expectations. Overall, Samae Dam chickens show strong potential for further development. Key strengths include adaptability, meat quality, and suitability for community-based production systems. However, limitations such as variability in growth performance and dependence on local markets remain. Future development strategies should focus on genetic improvement, optimized feeding programs, and strengthened market linkages.

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Conclusion and suggestions

Samae Dam (*Gallus gallus*) chicken in Uthai Thani Province, Thailand. In terms of average daily gain male and female, age ranges 0-3, 3-6, 6-8, and 0-8 weeks were 12.22 and 11.11 g/d, 32.22 and 20 g/d, 35.00 and 33.33 g/d, 14.58 and 13.33 g/ respectively in terms of feed conversion ratio male and female, aged 0-3, 3-6, 6-8 and 0-8 weeks were 2.45 and 2.70, 1.24 and 2, 1.40 and 1.50, 3.42 and 3.75, respectively. In terms of feed intake, males and females, age ranges 0-3, 3-6, 6-8, and 0-8 weeks are 30 and 30 g/d, 40 and 40 g/d, 50 and 50 g/d, 120 and 120 g/d, respectively. In terms of body weight gain and female, age ranges 0-3, 3-6, 6-8, and 0-8 weeks are 1,100 and 1,000 g/head, 1,900 and 1,800 g/head, 2,100 and 2,000 g/head, 3,500 and 3,200 g/head as for the comparison of sex characteristics to physical characteristics and chemical composition of meat of black macaque chickens. Physical characteristics found that L*(Lightness) was 42.152 - 48.734, a*(Redness) was -(1.218) - 3.022, b*(Yellowness) was 2.814-7.946, and the meat's water content was 23.342-107.845. The average texture of chicken meat was 2.007-5.920 for the chemical composition of the meat of Samae Dam breed chickens. The average daily gain, feed conversion ratio, and feed intake difference were not statistically significant ($P>0.05$). However, the study of participants in the project farmers showed a statistically significant difference in body weight gain compared to those who did not participate in the program ($P <0.05$). This study not only provides empirical data on production performance and economic returns but also offers practical recommendations and transferable technologies that can be directly applied by farmers to improve productivity and sustainability in indigenous chicken farming systems.

New knowledge and the effects on society and communities

The results indicate that a rearing period of 0–8 weeks is economically appropriate under the current production system. However, profitability is sensitive to market price fluctuations. Identifying an optimal selling price range is therefore essential for maximizing returns and supporting farmer decision-making. The findings of this study provide practical guidelines and applicable technologies for farmers, including semi-intensive production systems, improved feeding strategies using local and commercial feed, and regular health monitoring. In addition, the study highlights the effectiveness of technology transfer approaches, such as farmer training, on-farm demonstrations, and knowledge-sharing networks, in improving production efficiency and income. These approaches can be adapted and applied in other rural communities to support sustainable poultry production.

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