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Empowerment of Free-Range Chicken Farmers Through Local Feed Technology Based on Maggot and Corn at KPSH Sukabumi

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ABSTRACT

This empowerment program strengthened the capacity of the Sinar Harapan Farmer Group (KPSH) through the development and application of local feed technology based on maggot and corn. Training activities significantly improved participants' theoretical understanding and practical skills in maggot cultivation, maggot meal processing, corn flour production, and independent feed formulation. As a result, feed availability increased from 30% before the program to 100% after training. A standardized local feed production unit equipped with a dryer, grinder, mixer, and maggot cultivation facilities was successfully established, enabling the production of consistent, high-quality feed ingredients. KPSH is now capable of producing 3–5 kg of fresh maggot per day and processing it into nutrient-rich maggot meal, reducing feed costs while supporting sustainable waste management. Farmers also produce corn flour from locally sourced corn, enhancing feed independence and production stability. The adoption of maggot- and corn-based feed improved the productivity and efficiency of IPB-D1 chickens while creating new economic opportunities through maggot meal commercialization. The development of Standard Operating Procedures (SOPs), the formation of a trained technical team, and a long-term scale-up plan further strengthen program sustainability. Overall, this initiative demonstrates that appropriate technology, capacity building, and local resource optimization can significantly improve farmer independence, production efficiency, and community welfare.

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INTRODUCTION

The Sinar Harapan Farmer Group (KPSH) is a free-range chicken IPB-D1 farmer community established in 2019 and located in Jampangtengah Village, Sukabumi Regency, West Java. The group holds strong potential for developing breeding and fattening activities, supported by facilities such as a 2,000-egg incubator and chicken coops capable of accommodating up to 3,000 birds. However, these facilities have not been optimally utilized. DOC production only reaches 500 chicks per month, and chickens ready for harvest average around 500 birds per rearing cycle. This low productivity indicates limitations in production management, particularly in feed availability and efficiency.

Feed cost is the largest component in free-range chicken farming, accounting for 50–70% of total production expenses. At KPSH, feed cost is approximately IDR 15,000 per bird, significantly affecting profit margins. Moreover, the feed formulation used is not standardized. Farmers rely on a mixture of commercial feed and local ingredients—such as rice bran, corn, and indigofera leaves—blended manually without accurate nutritional calculations, leading to inconsistent feed quality and unstable growth performance. In fact, IPB-D1 chickens, as superior local poultry, possess high productivity potential when supported by nutritionally appropriate feed (Cyrilla & Sumantri, 2022).

The Jampangtengah area has abundant local resources that can be converted into alternative feed materials. Organic waste from local markets and households, for example, can be used for Black Soldier Fly (BSF) maggot cultivation. BSF maggot is recognized as a safe, nutritious, and environmentally friendly protein source and has been scientifically proven to substitute more expensive protein ingredients such as fishmeal (Mabruroh et al., 2022; Rusdi et al., 2024). Additionally, corn—an essential energy source in poultry rations—is widely available in the Sukabumi region at relatively stable prices (Octavia & Mu'min, 2023).

Despite this potential, KPSH has not maximized the use of maggot and corn due to limited knowledge, inadequate technical skills, and the absence of essential processing equipment such as dryers, grinders, and feed mixers. As a result, farmers remain dependent on commercial feed, increasing operational costs and limiting productivity. The group also faces marketing challenges, as digital platforms have not yet been utilized to promote and sell IPB-D1 chicken products.

Therefore, an empowerment program is urgently needed—one that offers not only alternative feed technology but also human resource development, production mechanization, feed standardization, and digital marketing enhancement. Such a program would enable farmers to independently produce feed based on maggot and corn, reduce production costs, and improve productivity and long-term business sustainability. This initiative aligns with national development goals and the Sustainable Development Goals (SDGs), particularly those related to food security, waste reduction, economic productivity, and sustainable community development.

METHODS

The program was implemented through five sequential stages designed to strengthen the capacity of the KPSH farmer group. The first stage, socialization, introduced stakeholders to the objectives, benefits, and implementation plan of the program while ensuring shared understanding and commitment. The second stage involved training, which covered BSF maggot cultivation, the production of maggot meal and corn flour, independent feed formulation, and digital marketing. This training combined theoretical

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explanations with hands-on practice to build both knowledge and technical skills, a method proven effective in improving farmer competency (Cyrilla & Sumantri, 2022).

The third stage focused on technology implementation, during which the farmers applied the techniques and technologies introduced in the training, including operating equipment for maggot processing and local feed production. The fourth stage consisted of mentoring and monitoring, providing ongoing guidance, technical assistance, and problem-solving support to ensure that the adopted technologies were used correctly and consistently. The final stage, sustainability evaluation, assessed the long-term viability of the program by reviewing performance outcomes, identifying challenges, and strengthening strategies for continued implementation.

Overall, the program was carried out over an eight-month period using a participatory approach that actively involved KPSH members, village authorities, and university partners, ensuring collective ownership and sustainable impact.

- Socialization

This initial stage aimed to provide stakeholders with an understanding of objectives, benefits, and program stages, while identifying partner needs, local resource availability, and KPSH's existing facilities.

- Training

Training utilized lectures, discussions, and hands-on activities.

- ✓ BSF Maggot Cultivation

  Activities included media preparation, egg placement, humidity management, harvesting, and odor control. Maggot cultivation is widely supported in research as an effective method for converting organic waste into high-value protein (Mabruroh et al., 2022).

- ✓ Maggot Meal and Corn Flour Processing

  Participants learned techniques for drying, grinding, and sieving raw materials into durable flour products. Maggot meal, with its high protein content, has been shown to improve livestock performance when used as a feed ingredient significantly (Rusdi et al., 2024).

- ✓ Independent Feed Formulation

  Activities included nutrient calculation, mixing techniques, and producing homogeneous feed using mechanical mixers. The role of corn as an energy source and bran as a fiber and nutrient contributor in feed formulas has been widely documented in poultry nutrition research (Octavia & Mu'min, 2023). The process includes washing, optional blanching, drying at 60–70°C for 6–8 hours to reach <10% moisture, grinding, sieving, and airtight storage to prevent contamination. These steps follow recommended maggot processing standards to ensure safety and nutrient stability (Mabruroh et al., 2022). The corn processing workflow includes sorting, drying to <13% moisture, crushing into grits, grinding into fine flour, sieving, and airtight storage. These procedures are consistent with studies emphasizing proper handling of grain-based feed ingredients to maintain nutritional value and prevent fungal growth (Octavia & Mu'min, 2023).

RESULT AND DISCUSSION

The training significantly enhanced participants' theoretical knowledge while also developing their

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practical skills in maggot cultivation, maggot meal processing, corn flour production, and independent feed formulation. This combination of theoretical learning and hands-on practice strengthened the farmers' capacity to adopt and implement local feed technologies effectively. The impact was evident in the improvement of feed availability, which increased from only 30% before the training to 100% after the training was completed (Figure 1).

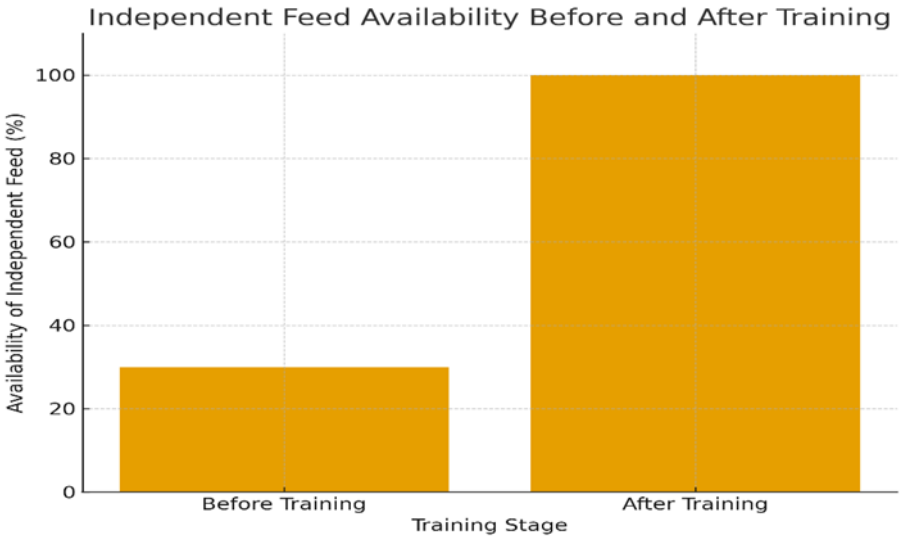

FIGURE 1. Independent Feed Availability Before and After Training

A standardized local feed production unit was successfully established to support the adoption of appropriate technologies within KPSH. The unit is equipped with essential machinery, including a dryer, grinder, mixer, and maggot cultivation facilities (Figure 2). The availability of these tools enables farmers to produce consistent, high-quality feed ingredients while optimizing the use of local resources. Through the program, KPSH has developed the ability to produce 3–5 kg of fresh maggot daily using readily available organic waste from the surrounding community. The harvested maggot is then processed into maggot meal with high protein content, providing an affordable alternative to expensive commercial protein sources such as fishmeal. This not only reduces feed costs but also contributes to environmentally sustainable waste management practices. Farmers are now capable of processing locally sourced corn into high-quality corn flour, which serves as a key energy ingredient in poultry feed. The use of local corn strengthens feed independence, reduces reliance on commercial feed inputs, and ensures more stable production availability. The program enabled farmers to formulate independent poultry feed using a combination of maggot meal, corn flour, rice bran, and vitamin–mineral premix. With the aid of mechanical mixing equipment, the feed produced is homogeneous and meets the nutritional requirements of free-range chickens. This approach supports improved growth performance, cost efficiency, and production consistency.

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FIGURE 2. Equipment for producing chicken feed from maggot meal and corn.

The program has generated positive social impacts by increasing community welfare and creating economic value from organic waste. Farmers are now able to develop and market maggot meal as a commercial product, opening new economic opportunities. Sustainability is strengthened through the development of Standard Operating Procedures (SOPs), the formation of a trained local technical team, and a strategic plan for scaling up maggot production and feed processing. These efforts ensure that the program's benefits can be maintained and expanded over the long term.

Assessment of participants' understanding of maggot cultivation showed substantial improvement after training. Prior to training, several participants demonstrated limited or no knowledge of maggot cultivation techniques. After completing the program, understanding levels increased significantly, with a higher proportion of participants categorized as having good to very good comprehension (Figure 3). This improvement reflects the effectiveness of the training approach in enhancing both knowledge and practical capability. These changes demonstrate that the training significantly increased participant comprehension and technical capability.

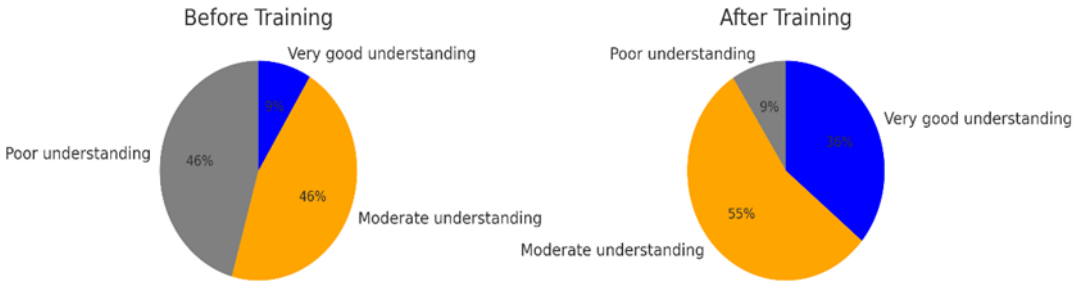

FIGURE 3. Community comprehension of maggot farming and maggot-based feed production.

CONCLUSION

The empowerment program effectively strengthened the technical capacity of the Sinar Harapan Farmer Group (KPSH) by enhancing their knowledge and practical skills in maggot cultivation, maggot meal production, corn flour processing, and independent feed formulation. The implementation of local feed technology not only reduced production costs but also improved the productivity and performance of IPB-D1 chickens. Furthermore, the adoption of maggot- and corn-based feed has proven to be an

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effective, economical, and environmentally sustainable solution that supports long-term farmer independence.

The establishment of standardized production facilities, the development of local technical teams, and the creation of clear Standard Operating Procedures (SOPs) further reinforce the sustainability of the program. Overall, this initiative demonstrates that empowering farmers through appropriate technology, capacity building, and local resource optimization can significantly enhance food security, economic resilience, and community welfare.

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