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Empowerment Of The GMIT Sion Kefamenanu Youth Group Through Eco-Friendly Kampung Chickens Farming

Charles Venirius Lisnahan[1)], Steffanie Merlin Clyricia Noach[1)], Wilda Lumban Tobing[2)], Lukas Pardosi[3)]
[1)]Animal Science Study Program, Faculty of Agriculture, Science, and Health, University of Timor, Kefamenanu – Indonesia
[2)]Agrotechnology Study Program, Faculty of Agriculture, Science, and Health, University of Timor, Kefamenanu – Indonesia
[3)]Biology Study Program, Faculty of Agriculture, Science, and Health, University of Timor, Kefamenanu – Indonesia

Email: charleslisnahan@yahoo.co.id

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Abstract

The purpose of this community service is to improve the knowledge, skills, income and welfare of the Partner Group in the PKM youth empowerment program of GMIT Sion Kefamenanu through environmentally friendly Kampong chicken cultivation. This community service was carried out at the GMIT Sion Kefamenanu Youth Group, East Nusa Tenggara. The method used is participatory action research, partner groups, religious leaders and the Implementation Team together determine the type of activity and implementation of activities in the field based on the urgency and priority of the problem. Solutions to the problems are based on the results of the initial situation analysis and adjusted to the needs and existing conditions. For this reason, socialization, training, technology application, evaluation and sustainability of the program are carried out. Extension activities, training/mentoring and practical implementation of activities aim to improve the group's abilities and skills. Mentoring activities include maintaining starter phase Kampong chickens in brooding cages and preventing disease with vaccination, maintaining the grower and pullet phases, making complete feed in the form of mash, crumble and pellets, drying feed with an oven and making bokashi fertilizer using cage waste. The results obtained in this PKM activity are that there has been a change in social behavior, knowledge and skills of youth groups in cultivating village chickens, including being proficient in handling chicks in brooding, handling growth phase chickens (growers and pullets), making complete crumble and pellet feed and being skilled in making bokashi fertilizer.

Keywords: GMIT Sion Youth Group; brooder; kampung chicken; complete feed, bokashi

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INTRODUCTION

Kampung chickens are a highly valued livestock commodity known for their long-standing presence and ease of rearing. Nationally, the population of these chickens has increased by 4.32% since 2019. By the end of 2023, the population in East Nusa Tenggara (NTT) Province reached 9,937,677 birds, yielding 10,968.21 tons of meat and 9,416.75 tons of eggs (Livestock and Animal Health Statistics, 2022). The government specifically in North Central Timor

(TTU) Regency has prioritized the development of local products, including Kampung chickens, to meet community needs (TTU Regency Medium-Term Development Plan/RPJMD, 2021). A key advantage of raising these chickens is their higher selling price compared to commercial broiler or layer breeds; they can fetch up to IDR 100,000 per bird, with an average profit margin of 30–35% (FCR 5.6) at an age of 3.5–5 months (Lisnahan, 2018).

One of the youth groups in North Central Timor (TTU) Regency running a creative Kampung chickens farming initiative is the youth group of the Sion Kefamenanu Evangelical Church in Timor (GMIT), which comprises 82 committee members. The group was established when the Sion Congregation became independent in 2004, and its leadership is renewed every four years. The leadership team for the 2024–2028 term was formally appointed via the Decree of the Chairperson of the Sion Sasi Congregation Council (Number 03/SK/MJ-GMIT/Feb/2024, dated February 4, 2024). The Sion Church is located 4.8 km from the Timor University campus. The GMIT Sion youth group assists in the church's ministry, specifically supporting the five pillars of congregational service: marturia (witnessing), diakonia (service/charity), koinonia (fellowship), liturgia (worship), and oikonomia (stewardship). While youth activities are funded by the congregation's treasury, these funds are limited and insufficient to cover the costs of all planned annual activities; consequently, the youth seek additional funding through various creative initiatives. Leveraging the youth's creativity and the competencies of specific members, several productive units were established to generate the necessary revenue. One such activity is Kampung chickens farming, involving the rearing of approximately 100 chickens per cycle. This creative/productive unit has been operational since 2021. Proceeds from the sale of the chickens are used to fund the five pillars of ministry, as well as activities for developing interests, talents, and other skills (Figure 1).

Figure 1. GMIT Sion Kefamenanu youth and one form of diaconal activity

A challenge faced by the partner group during the rearing of Kampung chickens is a lack of mastery over intensive management practices, as the chickens are raised without adequate monitoring. Issues arise during the brooding phase; while the chicks are being reared, the temperature and humidity levels within the brooding area do not meet their specific needs. The heat source in the brooding enclosure serves merely as a light source (Figure 2). Chicks require active heating because their plumage does not yet function effectively as an insulator to regulate body heat specifically, to prevent excessive heat loss or gain. If the enclosure temperature is

unsuitable, feed efficiency drops, subsequently leading to an increased chick mortality rate. The mortality rate among chicks in the partner group exceeds 25% per rearing cycle.

Figure 2. Behavior of chicks at low and high brooding temperatures

Another issue regarding husbandry practices is the type of feed provided, which consists of broiler feed, yellow corn, and kitchen scraps. In terms of growth, broiler chickens require feed with higher protein content due to their rapid growth rate. In contrast, Kampung chickens require lower protein levels because their genetic growth rate is slower. Using broiler feed, which is relatively expensive in this manner results in a waste of dietary protein. Furthermore, feed with excessively high protein content leads to elevated ammonia levels in the coop, causing air pollution. Another problem is the lack of knowledge regarding quality feed needed to boost productivity. Consequently, the Kampung chickens grow slowly, and the time required to reach harvest age is prolonged. While Kampung chickens raised under intensive management can be harvested within 3.5 to 5 months, the chickens raised by the partner groups take over 5 months and sometimes up to 8 months to reach harvest age.

The management of poultry house waste is a matter of particular concern, as it frequently causes pollution in the vicinity of the facility. Poultry waste typically consists of a mixture of feces and urine (excreta), wasted feed, and bedding material (such as rice husks). This waste emits unpleasant odors and pollutes the environment, potentially compromising human health and comfort; therefore, proper management is required. Under normal conditions, the amount of excreta produced by an adult-chicken ranges from 33 to 45 grams per day. Its texture and color depend on the dry matter content of the feed and the amount of water consumed. Chicken excreta contain N, NH4, P, K, Ca, Mg, sulfides, Mn, Zn, and Cu. On average, every ton of chicken excreta contains 65.8 kg of N, 13.7 kg of P, and 12.8 kg of K (Kusuma and Erviana, 2012; Lilhaq et al., 2017; Winarno, 2018). Historically, this waste has simply been collected and either burned or discarded as refuse at the end of each production cycle. Consequently, processing the waste into organic fertilizer specifically bokashi is necessary to address this issue. By converting chicken excreta into bokashi organic fertilizer, Kampung chicken farming operations can become environmentally friendly.

Figure 3. Livestock waste that is merely collected and burned or discarded in the trash

Based on these issues, the community service team and the partner group agreed to implement improvements in husbandry management, the formulation of complete rations using local feed ingredients, while ensuring micronutrient balance management from the day-old chick (DOC) stage to harvest (5 months), and the handling of livestock waste.

METHOD

This community service initiative employed a participatory action research method, actively involving the GMIT Sion Youth Group, religious leaders, and the implementation team in determining and executing activities in the field. A team of undergraduate students provided support and mentoring, serving as a mechanism for monitoring and evaluation while simultaneously enhancing their own skills and preparing them for the workforce. The partner group played an active role throughout every stage of the initiative from the preparatory meeting and program selection to implementation and evaluation to address the issues they faced. The partner group and the implementation team discussed challenges encountered during Kampung chicken rearing and agreed upon which issues to prioritize. Daily activities during the project period were carried out by the partners, assisted by the trained students. The partner group was also involved in periodic evaluations throughout the duration of the project.

The five stages of activity implementation with the partner group are as follows:

1. **Socialization**. The preparatory phase involves a collaborative effort between the community service team and the partner group to determine the specific activities previously formulated by the team based on a situational analysis of the issues that align with the partner group's needs and existing conditions.
2. **Training.** The activities continued with outreach, training, and mentoring provided by the lecturers and the support team, alongside practical sessions designed to enhance the skills of the partner groups. This stage involved presentations on the methods or models developed for each activity, combined with hands-on training and field application specifically the

construction of brooding pens for chicks, the production of complete feed, and the making of bokashi (fermented organic fertilizer).

3. **Implementation of technology.** The technology implemented is:
   a. A brooder unit is prepared for the starter phase of rearing. Day-old chicks (DOC) are placed in the brooder and kept there for six weeks. The brooder measures 2 x 1 x 0.6 meters and accommodates 100 chicks. All sides are constructed from wire mesh, and the top is left open starting from the second week. Two incandescent bulbs (75 watts each) are installed in the brooder because the chicks down feathers do not yet effectively insulate their bodies. During the first two weeks, feed is provided in four trays; these are subsequently replaced by six small feeders, while drinking water is supplied via two gallon-sized containers (holding 2 liters each). On the first day, sugar is added to the drinking water to boost energy levels; thereafter, the water is supplemented with vitamins until the chicks are two weeks old. Vaccination with the ND1 vaccine is administered on the fourth day. Air temperature within the enclosure is adjusted based on the chicks' behavior; if they huddle near the incandescent bulbs, it indicates the temperature is too low, requiring the lights to be lowered closer to the chicks. The ND2 vaccine is administered at 21 days of age. At six weeks of age, the chicks are transferred to the grower enclosure.
   b. Preparation of complete feed and management during the starter phase. Feed ingredients were ground using a feed mill to achieve uniform particle size. The feed was formulated with a balanced nutrient composition tailored to the requirements of each rearing phase (starter, grower, and pullet), based on research findings. The ingredients used were relatively inexpensive and locally available such as yellow corn, rice bran, and limestone with the exception of fish meal, soybean meal, vitamin and mineral premixes, and the amino acids methionine, lysine, threonine, tryptophan, arginine, and valine. The nutrient composition for the starter phase was as follows: ME 2,958.21 kcal/kg, crude protein 16.76%, crude fat 6%, ash 7%, crude fiber 7%, methionine 0.3%, lysine 0.85%, threonine 1.00%, tryptophan 0.60%, arginine 1.00%, valine 0.78%, calcium 1.60%, and phosphorus 0.6% (Lisnahan et al., 2017a; Lisnahan et al., 2017b; Lisnahan et al., 2018; Lisnahan and Nahak, 2019; Lisnahan and Nahak, 2020; Lisnahan et al., 2022; Lisnahan et al., 2023a; Lisnahan et al., 2023b; Lisnahan et al., 2024). After the ingredients were homogeneously mixed, they were processed into pellets using a pellet mill and subsequently crushed into a crumble form. The crumbles were then dried in an oven until the feed moisture content reached approximately 15%.
   c. Preparation of complete feed and management during the grower phase. The feed is provided in pellet form and formulated to meet both macro- and micronutrient requirements. The feed ingredients are the same as those used in the starter phase, but the nutrient composition specifically crude protein and amino acid levels is lower. The nutrient composition for the grower phase is as follows: ME 2971 kcal/kg, crude protein 15.26%, crude fat 6.18%, ash 7.64%, crude fiber 7.24%, methionine 0.25%, lysine 0.60%, calcium 1.47%, phosphorus 0.60%, threonine 0.80%, tryptophan 0.45%, arginine 0.78%, and valine 0.52% (Lisnahan et al., 2017a; Lisnahan et al., 2017b; Lisnahan et al., 2018; Lisnahan and Nahak, 2019; Lisnahan and Nahak, 2020; Lisnahan et al., 2022;

Lisnahan et al., 2023a; Lisnahan et al., 2023b; Lisnahan et al., 2024). Feed is provided twice daily, while drinking water is replaced daily.

d. Preparation of complete feed and rearing during the pullet phase. The feed was provided in pellet form. The feed composition was: ME 2,969.35 kcal/kg, crude protein 13.12%, crude fat 6.44%, ash 7.13%, crude fiber 7.69%, methionine 0.20%, lysine 0.45%, calcium 1.25%, phosphorus 0.60%, threonine 0.60%, tryptophan 0.30%, arginine 0.60%, and valine 0.32% (Lisnahan et al., 2017a; Lisnahan et al., 2017b; Lisnahan et al., 2018; Lisnahan and Nahak, 2019; Lisnahan and Nahak, 2020; Lisnahan et al., 2022; Lisnahan et al., 2023a; Lisnahan et al., 2023b; Lisnahan et al., 2024). Feed was provided ad-libitum twice daily.

e. Production of organic fertilizer (bokashi). Daily excreta output from adult chickens amounts to 33–45 g of dry matter per bird (4 kg/100 birds/day); this is processed into organic fertilizer by mixing it with EM4 probiotics and palm sugar. The bokashi production process involves preparing a 1 x 1 meter pit. Free-range chicken excreta mixed with rice husks is combined with palm sugar and EM4 in the following ratio: 10 kg excreta: 0.5 liters palm sugar: 100 ml EM4 (Kusuma and Erviana, 2012; Lilhaq et al., 2017; Winarno, 2018). The mixture is placed in the pit and covered. The bokashi mixture is watered daily for two weeks. Afterward, the product can be used for agricultural or plantation crops and sold if production volume is high.

4. **Mentoring and evaluation.** The implementation of all activity stages within the partner group is supported by students and lecturers. This assistance covers the setup of brooding facilities for chick rearing, the grinding of feed ingredients and ration mixing (producing crumbles and pellets), feed drying using an oven, and guidance on organic fertilizer production. Each stage of the activity is evaluated to ensure improved outcomes. Evaluation involves comparing the group's understanding and skills, equipment application and utilization, and management capabilities specifically regarding chick (starter) rearing, grower and pullet phases, and coop waste handling before and after each activity. Evaluations are conducted progressively in alignment with the work stages, while monitoring the achievement of success indicators at each step.
5. Program sustainability. Community service activities with the partner group are supported by lecturers and students on a semesterly basis or as required by the group. Following the program's implementation, the proposing team addresses any issues raised by the partner group regarding Kampung chickens farming by providing concrete solutions. The team continues to provide guidance on Kampung chickens development to the partner group, aiming to apply the latest science and technology derived from research findings.

RESULTS AND DISCUSSION

The results obtained during the activities with the partner group are described as follows:

1. Chicks (Day-Old Chicks/DOC) reared in brooders (artificial brooding units) thrived due to the provision of heating and a regimen of proper hygiene and regular vaccination specifically, ND 1 vaccine on day 3 and ND 2 vaccine on day 21 (Figure 7). This success was evidenced by weight gain and a mortality rate of less than 10%. In contrast, prior to

this community service initiative, chick mortality reached 20% by six weeks of age and rose to 35–40% by the grower phase when brooding facilities were not used and vaccination protocols were neglected.

Figure 5. Implementation team and the GMIT Sion Kefamenanu Youth Group

Figure 6. Briefing by the Head of the Implementation Team

Figure 7. Brooding management and vaccination of chicks

Figure 8. Kampung chickens from the partner group at 12 weeks of age

2. The feed utilizes more affordable local raw materials while maintaining quality. These ingredients are ground and mixed on-site to create complete rations for Kampung chickens tailored to their specific growth stages. This feed formulation incorporates several micronutrients, namely synthetic amino acids (methionine, lysine, threonine, tryptophan) as well as vitamin and mineral premixes. The feed is produced in crumble and pellet forms: crumbles are used for the starter phase, while pellets are used for the grower and pullet phases (Figures 9 and 10) (Lisnahan et al., 2017a; Lisnahan et al., 2017b; Lisnahan et al., 2018; Lisnahan and Nahak, 2019; Lisnahan & Nahak, 2020; Lisnahan et al., 2022; Lisnahan et al., 2023a; Lisnahan et al., 2023b; Lisnahan et al., 2024). Producing these rations independently allows for a 30–35% reduction in feed costs compared to commercial feed purchased from poultry shops in Kefamenanu, NTT.

Figure 9. Feed grinding and mixing

Figure 9. Feed grinding and mixing

3. The group has successfully utilized chicken manure (excreta) a livestock waste byproduct to produce bokashi fertilizer. The excreta, mixed with rice husks, is processed into fertilizer by combining it with EM4 and palm sugar (Figure 11). Currently, the resulting bokashi fertilizer is being used for vegetables and ornamental plants (flowers).

Figure 11. Production of bokashi fertilizer

4. The social behavior of the partner group has begun to shift due to the application of science and technology. This is evident in the increased attention to management and the greater amount of time dedicated to free-range chicken farming, as well as in the improved knowledge and skills regarding the practice.

The impact (in terms of utility and productivity) of the community service activities with the partner group (GMIT Sion Youth) is clearly evident in changes regarding social behavior, knowledge of technology usage, and income from free-range chicken farming, as shown in Table 1.

Table 1. Impact (Utility and Productivity) of Community Service Activities with Partner Groups

Number	Description	Impact (usefulness and productivity)		Explanation
		Previously	After the activity	
1.	Changes in skills/knowledge	Lacking understanding and skills in raising Kampung chickens	The group has become skilled at raising Kampung chickens	Farmers can carry out brooding, vaccination, feed mixing, grower-phase rearing, and bokashi production

2.	Social impact	Insufficient attention paid to the Kampung chickens raised by partner groups	More time and energy are devoted to raising Kampung chickens	Full daily attention, with a schedule shared among group members
3.	Brooding pen	Chicks are raised without paying attention to temperature conditions and cleanliness in brooding	Chicks are reared in a brooder at a temperature suited to their needs, following a regular prevention regimen (hygiene and vaccination)	Brooding temperature and humidity are controlled to optimize chicken growth and ensure a low mortality rate (below 5%)
4.	Vaccination	Never vaccinated, particularly against Newcastle disease	The group learned about vaccination via eye drops (at 3 days of age) and through administration in drinking water (at 21 days)	Chicken mortality rate is below 5%
5.	Feed used	BR 1 & 2 feed, kitchen/agricultural waste, shelled corn	The homemade concentrate consists of ground corn, rice bran, wheat bran, fish meal, the amino acids methionine, lysine, threonine, tryptophan, arginine, and valine, a mineral premix, and a vitamin premix	Nutrients are increasingly complete and balanced according to the livestock's needs at each stage
6.	Crumble and pellet feed	BR 1 & 2 feed, kitchen/agricultural waste, shelled corn	Complete feed in mash, crumble, and pellet forms	Mash or crumble for the starter phase (1–6 weeks), and pellets for the grower and pullet phases (6 weeks until the onset of production)
7.	Feed efficiency/feed cost ratio	BR-1 or BR-2 feed purchased at Rp10,000–11,000 per kg	Self-formulated concentrate feed: Rp6,500–7,000/kg	Feed cost savings of Rp4,000–4,500 per kg were achieved
8.	Utilization of technology	The feed is purchased from a poultry shop, not made in-house	The feed is produced by grinding feed ingredients, manufacturing pellets and crumbles, and oven-drying the feed	There are efficiencies in time, labor, and production costs
9.	Increased income/welfare	The chicken is sold for Rp100,000 after eight months	The chickens are sold for Rp100,000–Rp150,000 after 4–5 months	There are savings in maintenance time and feed, resulting in higher profits

CONCLUSION

Based on the Community Partnership Program (PKM) activities conducted with the GMIT Sion Kefamenanu Youth Group, it can be concluded that the partner group has gained the understanding and skills necessary for brooding, chick vaccination, feed production (mash, crumble, and pellet forms), oven-drying of feed, and the production of Bokashi fertilizer using chicken manure. Furthermore, the partner group has improved its feed management across the starter, grower, and pullet phases. Consequently, there have been behavioral and social changes, as well as an increase in income following the sale of the chickens.

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