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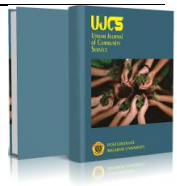

Empowering Kadilanggon Village-Owned Enterprises through Dissemination of Undegradable Nutrients (RUNs) Rumen Supplement Technology to Increase Livestock Productivity in Klaten Regency

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Abstract: Klaten Regency is a food production area designated by the Province of Central Java. Livestock farming has the potential to be developed to improve the community's economy. Inadequate feed nutrient requirements have an impact on low livestock productivity. Farmers will also incur additional costs for feed procurement, which increases production costs and tends to be detrimental to farmers. The empowerment program aims to disseminate concentrate feed technology with the addition of Rumen Undegradable Nutrients (RUNs) supplements to the Kadilanggon Village-Owned Enterprise (BUMDes) in Wedi District, Klaten Regency. Rumen Undegradable Nutrients is a feed supplement technology that contains fat protection and protected amino acids (lysine and methionine) to increase livestock productivity. The implementation process consisted of 1) socialization of the program implementation plan, 2) training in the production of RUNs supplements, 3) production of concentrate feed with the addition of RUNs supplements, 4) testing of concentrate feed on livestock, and 5) monitoring and evaluation of program implementation. The empowerment program has increased the knowledge and skills of livestock group members regarding feed and concentrate production methods using RUNs feed supplement technology. Additionally, the developed feed factory has generated economic value and provided employment opportunities.

Keywords: Concentrate, Livestock, Rumen Undegradable Nutrient, Sheep.

Introduction

Klaten Regency is a food and livestock production area in Central Java Province. Badan Pusat Statistik Jawa Tengah (2017) reported that the total population of beef cattle, dairy cattle, buffalo, goats, and sheep is relatively high in Klaten Regency. Feed is one of the determining factors in increasing livestock productivity, so the quality and quantity of forage must be maintained (Budiari & Suyasa, 2019; Prayitno et al., 2018; Valini et al., 2021). The shortage of feed in Klaten Regency has resulted in decreased livestock productivity.

Feed is one of the most important components in a livestock business. Feed accounts for 70-80% of the total production costs of livestock farming (Simanjuntak, 2018). Nurjannah et al., (2019) also stated that feed is one of the factors that determine the success of a livestock business. Syam et al., (2016) stated that ruminant feed consists of forage and concentrate as a supplement. Concentrate feed is a type of feed that is readily fermented, thereby stimulating the growth of rumen microbes that play a role in digesting crude fiber. Feed shortages due to drought cause a decline in livestock productivity and an increase in feed costs,

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which in turn leads to a decline in farmer income and threatens the sustainability of livestock businesses.

Based on these problems, one solution that can be implemented to solve the problem of feed shortages in Klaten Regency is to independently produce ruminant concentrate feed with the addition of Rumen Undegradable Nutrient (RUN) supplements, supported by a feed mixer machine. This feed contains fatty acid protection with the amino acids lysine and methionine (Manafi et al., 2019; Tugiyanti et al., 2022). Protected fatty acids can be utilized by livestock as an energy source. Carnitine is needed to help break down this energy. The formation of carnitine requires lysine as a component, while methionine plays an important role in increasing productivity and muscle or meat formation in livestock. The application of fat supplementation technology in feed can increase the energy sources that can be utilized by livestock, which will indirectly affect livestock growth and productivity (Alhaidary, 2010).

The production of ruminant concentrate feed with the addition of Rumen Undegradable Nutrient (RUN) supplements and the use of feed mixer technology aims to assist BUMDes Putro Manggolo in its efforts to provide quality livestock feed by optimizing the village's potential in terms of land use and high livestock population. In addition, BUMDes Putro Manggolo can efficiently produce concentrate feed with the addition of RUN supplements for marketing. The high-quality feed produced is expected to increase livestock productivity, which in turn will improve the welfare of livestock farmers.

Method

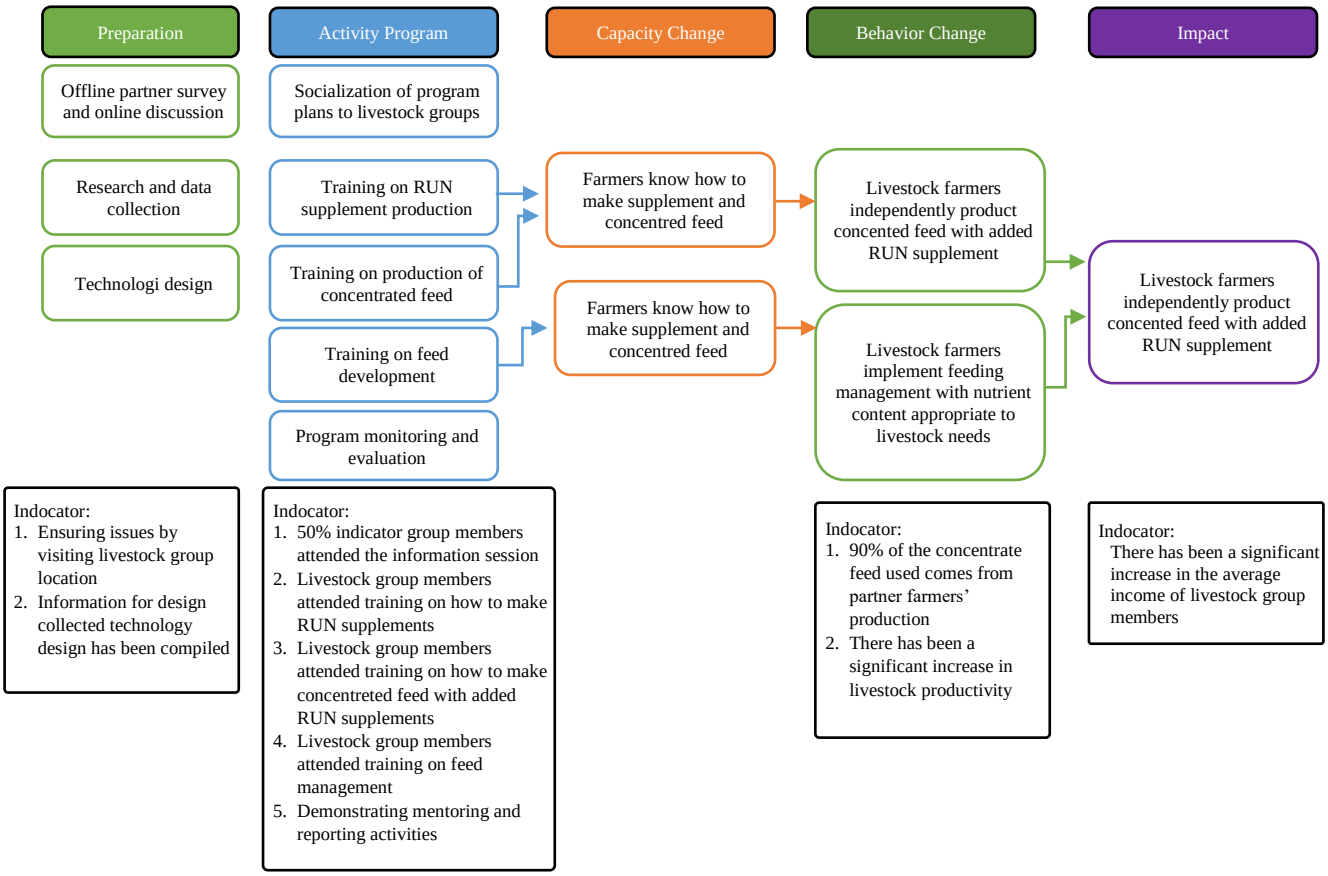

Figure 1. Stages of the community service program at BUMDes Putro Manggolo in Kadilanggon Village

This community service program was carried out in Kadilanggon Village, Wedi District, Klaten Regency, Central Java Province. The activity was held from April to October 2023 and was attended by members of the Putro Manggolo Village-Owned Enterprise (BUMDes) and livestock farmers. The program implementation method consisted of several stages as follows:

1. Socialization of the program to BUMDes members and farmers. The socialization activity aimed to provide an overview, objectives, and targets of the community service program. The socialization

activity also included the distribution of pre-test questions to determine the level of knowledge and understanding of the livestock group members regarding concentrate feed and additional supplements.
2. Training on the production of RUN supplements and concentrated feed.
3. Training on the production of concentrate for ruminants with the addition of Rumen Undegradable Nutrients supplements. The training was conducted directly with the assistance of the community service team. This activity aimed to provide an understanding of the theory that had been taught.
4. Trial of the feed successfully produced on livestock. The feed trial aimed to test the feed's acceptability to livestock.
5. Monitoring and evaluation of program implementation. Monitoring activities are carried out through regular coordination to determine the progress of concentrate feed production. In addition to these activities, an evaluation is conducted at the end of the program in the form of a post-test. The results of the post-test and pre-test are then analyzed using the T-Test from SPSS 26.0 to determine the increase in the knowledge and skills of the partners. The stages of the community service program implementation in Kadilanggon Village, Klaten Regency, are shown in Figure 1.

Result and Discussion

The results of the community service activities that have been carried out show an increase in the partners' ability to produce concentrated feed, an increase in livestock productivity, and an increase in the sustainability potential of the program. The increase in partner capacity is shown in Table 1.

Table 1. Increase in Partner Capacity (Not Actual Data)

Knowledge Level n=20	Score (Mean±SD)		95 % Confidence Interval	
	Pre-test	Post-test		
Feed Supplement	41.74±10.66[a]	77.48±11.91[b]	-40.22	-31.25
Concentrated Food	41.16±11.80[a]	79.80±11.40[b]	-43.24	-34.03
Livestock Feed Management	40.70± 9.93[a]	80.52± 9.73[b]	-43.72	-35.91

Description:
n = Number of respondents
a, b = Indicates a significant difference (P<0.05)

The outreach program was held in May 2023 at the Kadilanggon Village multipurpose building, following coordination between the outreach team and the Director of BUMDes Putro Manggolo. The outreach activity was attended by approximately 20 BUMDes members and livestock farmers, most of whom were young people. The socialization activity was carried out to explain the objectives, program targets, and types of activities (extension and training) to be implemented, as well as the program activity schedule. In addition, during the socialization activity, an organizational structure was formed to assign responsibilities according to the roles of each member in the implementation of the program.

Figure 2. Socialization of the Community Service Program

The program socialization activity is shown in Figure 2. In general, the socialization activity ran smoothly, with the material presented including livestock development patterns using concentrates and the addition of feed supplements to obtain higher productivity. This material aims to provide an overview to farmers regarding the important role of concentrates in increasing livestock productivity. In addition, material related to the production of RUN feed supplements and concentrate feed was provided before the farmers made them directly. Livestock group members were also given an understanding of reasonable and appropriate feed management in accordance with livestock needs. Livestock group members were given a post-test in the form of a questionnaire consisting of several questions about concentrate feed and feed supplementation. The questionnaire aimed to determine the farmers' level of understanding of livestock feed and the material that had been presented.

Corea et al. (2020) stated that the addition of rumen undegradable protein-nutrients in livestock feed can increase livestock growth (productivity) rates. The Rumen Undegradable Nutrient (RUN) supplement (Figure 3) was made using fat from Crude Palm Oil (CPO), amino acids consisting of methionine and lysine, CaCl2, and NaOH. These ingredients were chosen

because they are readily available at affordable prices. Eight members of the BUMdes and livestock farmers were involved in the production of feed supplements. These members will later serve as the persons in charge of the production of concentrate feed containing RUN feed supplements. The training activities for the production of RUN feed supplements are shown in Figure 3.

In general, the training activities for the production of RUN supplements ran smoothly, with the training material provided in the form of an introduction to the types and forms of raw materials used. Partners were also given training related to the methods and stages of supplement production. In addition to this material, partners were also given training on methods for mixing RUN feed supplements into concentrated feed. Based on the training and mentoring activities provided, the livestock group members now have the knowledge and skills to make RUN feed supplements and know how to mix them into concentrate feed. This improvement is evidenced by the significant difference between the pre-test and post-test results (Table 1). There were no obstacles in the training process for making feed supplements.

Figure 3. Training on Making RUN Feed Supplements

Singh & Sharma (2019) stated that the use of concentrate as animal feed will accelerate livestock growth, thereby increasing productivity. Training on the production of feed concentrate with the addition of RUN supplements at BUMDes Putro Manggolo (Figure 4) aimed to provide partners with knowledge and skills on how to produce appropriate feed concentrate, in line with livestock needs. Feed concentrates are made using quality feed ingredients with a nutrient composition and function that can meet livestock needs.

The use of local raw materials is one of the points emphasized in the manufacture of feed concentrates. In addition to being readily available, they are also cheaper, resulting in concentrates at prices that are affordable for small farmers. The training activity on concentrate feed production is shown in Figure 4.

Figure 4. Training on Concentrate Feed Production with the Addition of RU Supplements

The training activity on concentrate feed production with the addition of RUN supplements was attended by 80% of the livestock group members, who were predominantly young people. This activity ran smoothly with the active participation of the partners. In the training that has been conducted, the level of participation of young farmers was relatively high (75%) of the total members. Previously, concentrate feed production still used manual methods (farmer labor) with limited production (1-2 tons per month) and required more time.

The use of feed mixer technology with a larger capacity can streamline time and increase concentrate feed production by approximately 10-15 tons per month initially and 30 tons per month when production is optimal. Mixer machines play an important role in mixing two or more feed ingredients to become homogeneous (Balami et al., 2013). Since the price of the produced concentrate is cheaper than factory-made concentrate with similar quality, it indirectly helps farmers reduce feed costs and increase livestock productivity. To date, partners have improved their skills in producing RUN-supplemented concentrate (Table 1), and 90% of the total concentrate used comes from partners' independent production.

Sandi et al. (2019) state that good feed management consists of the type of feed given, the amount of feed according to livestock needs, the balance between forage and concentrate requirements, the frequency of feeding, and the proper feeding procedures. Feed management training activities were carried out through direct practice of appropriate feeding based on livestock needs. Previously, partners had been provided with feed management materials. The results of the activities showed an increase in the partners' ability to implement proper feed management (Table 1). The concentrated feed management practice activities are shown in Figure 5.

Figure 5. Concentrate Feeding Trial on Livestock

The feed trial was conducted by feeding concentrate with added RUN supplements to livestock owned by members of the livestock group. The feed trial aimed to determine the increase in livestock productivity by evaluating the increase in livestock weight. The results of the feed trial showed significant efficiency and increased livestock productivity (body weight), which would indirectly affect the efficiency of livestock maintenance time. This is in accordance with the opinion of Rouf & Munawaroh (2016), who stated that the growth of livestock productivity is related to technological changes, technical efficiency, and economic scale of operations.

Monitoring activities were carried out by conducting routine coordination every two weeks to monitor the development of concentrate feed production. In addition, routine consultations were held to solve problems faced by partners as a form of assistance from the community service team. Evaluation activities were carried out by filling out a final questionnaire to determine the level of understanding and skills of partners in developing concentrate feed production and implementing the program on an ongoing basis. Tumion et al., (2017) stated that livestock development programs are a series of activities aimed at providing facilities and developing competitive agribusiness systems that are community-based and sustainable in order to improve community welfare. To date, partners have been able to produce concentrated feed with the addition of RUN supplements independently. Another impact experienced by the partners is a reduction in unemployment and an increase in the average income of farmers in Kadilanggon Village. In addition, BUMDes Putro Manggolo has been able to develop a productive, concentrated feed factory business. The RUN-supplemented concentrated feed product under the Jawara Concentrated Feed brand, produced by BUMDes Putro Manggolo, is shown in Figure 6.

Figure 6. Jawara Concentrate Feed Product with RUN Supplement

Conclusion

Based on the community service activities that have been carried out, it can be concluded that members of BUMDes Putro Manggolo and livestock farmers have increased their knowledge about the important role of concentrate feed in livestock farming. BUMDes members have skills in concentrated feed production. The feed factory business developed by BUMDes Putro Manggolo has become a productive business owned by Kadilanggon Village.

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